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• NOGI AWARDS

• KODAK'S HOBBY-PAC
COLOR DEVELOPERS

• DISCOVER FISHEYE
PHOTOGRAPHIC

• CAYMAN ISLANDER-HOTEL
WITH A PERSONAL TOUCH

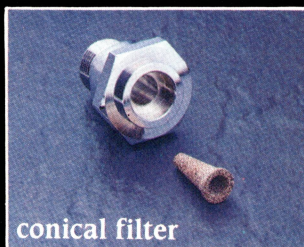
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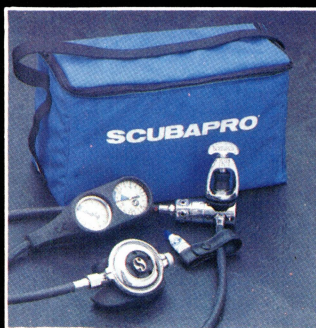
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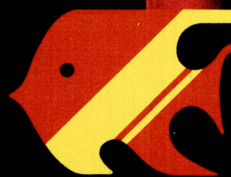


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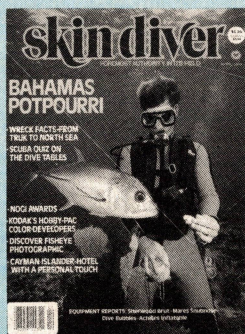
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skindiver

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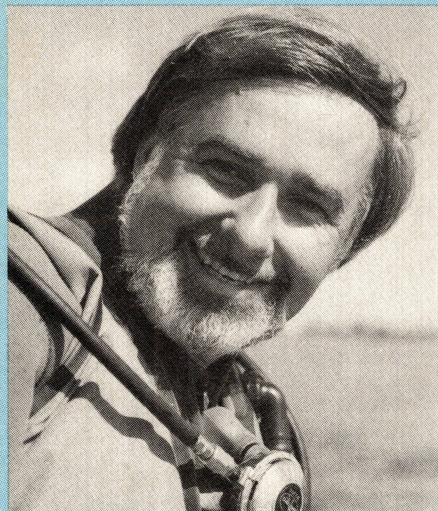
COVER

Bahamas divemaster Danny Batchelder experiences a rare fish feeding encounter with a friendly horse-eye jack. For more about the Bahamas see the special section beginning on page 57. Photo/Geri Murphy.

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SDM Editorial

BY THE PUBLISHER



SEVEN DEADLY SINS

A dive regulator is subjected to a wide variety of corrosive contaminants because of the harsh environment in which it must function. Salt air and saltwater moisture from ocean trips can collect inside and freeze working parts. Carbon dust, chlorinated water, ozone and hard-water mineral deposits can also do damage. The accumulation of these harmful deposits is usually not noticeable because the process is so slow, so gradual.

Even though you have stored it in a cool, dry place, those deadly corrosive contaminants have had their chance to form hard, crusty deposits in the regulator and do more harm than actual use in open water. Much of this damage goes unnoticed because it is happening inside, hidden from the eyes of the owner.

Several leading regulator repair technicians have revealed seven deadly sins against regulator performance:

1) Hard Breathing is most commonly caused by saltwater corrosion. Internal moving parts become encrusted with salt crystals and a scale, which causes them to stick or operate sluggishly. Inhalation resistance is often tripled or quadrupled, thus making it extremely difficult or impossible to obtain sufficient airflow at depth during heavy breathing.

2) Rust Clogging the sintered filter of the first stage can be caused by the rust or corrosion dust which accumulates inside a scuba tank. Fine rust particles clog the pores of the filter screen and often coat the internal moving parts, causing sluggish or sticky operation.

3) Carbon Dust Clogging sometimes results from ultra-fine carbon dust, the by-product of a poorly-operating air compressor. The carbon dust comes from the charcoal filter on the air com-

pressor. This condition may go unnoticed for quite some time because the buildup is so slow and the dust almost invisible.

4) Water Leakage in the regulator mouthpiece is commonly caused by the deterioration of the second stage exhalation valve. The super-thin rubber disc becomes gummed-up from the effects of chlorinated pool water, ozone in the atmosphere or normal aging. Stickiness of operation can cause increased exhalation resistance, intermittent water leakage and finally complete flooding of the second stage.

5) Free Flowing can be caused by dirt or dust particles which mar or dent the high pressure valve seat in the first stage. The smallest speck of dirt or rust on this finely-machined surface can cause a steady seepage of high pressure air into the low pressure hose and second stage. The damage is irreversible and the leak tends to get worse with additional use, until air is flowing out of the regulator mouthpiece in a steady, uncontrolled stream.

6) O-ring Leaks can result from the buildup of salt corrosion inside the regulator or from a general drying out of the silicone lubricant needed to keep these seals healthy. The slightest crack, tear, nick or split on the surface of an O-ring will break the seal and cause either an intermittent or steady leak of air. Continued use of a faulty O-ring can result in a complete break of that seal and the rapid flow of large amounts of air.

7) Erratic Flow of air can be caused by a second stage which is not properly tuned or has parts that are sticking. The intermediate stage pressure may be wrong, or the second stage lever improperly set, or perhaps the breathing diaphragm is brittle. Internal parts and settings go out of whack as a result of aging, hard use or saltwater exposure.

No amount of washing or careful use can completely prevent your regulator from getting out of tune. Routine maintenance can prolong its good performance, but eventually your regulator will need

service and tuning. The job should be done every six months or once a year, depending on the amount of usage and the kind of exposure your particular unit receives. Generally speaking, a good internal cleaning (ultrasonic or acid dip) by an experienced regulator repair technician will take care of 90 percent of the performance problems. Parts replacement is generally minimal, amounting to a few O-rings, and perhaps a valve seat and more flexible breathing diaphragm.

Considering the vital importance of good regulator function, the cost of cleaning and tuning is surprisingly reasonable, usually under \$50, most of which is for technician labor. When you divide this repair charge by the number of months of trouble-free performance you receive, it amounts to a small maintenance charge of three to four dollars per month. It is a small price to pay for the care of a life support device.

Where should you take your regulator for repair? You have several options available. The most obvious is your local professional dive store where you may have originally purchased your regulator or where you regularly obtain air fills. Many pro dive stores maintain a well-stocked service center for the equipment they sell and their technicians are sent to dealer repair workshops conducted by the factory. Another option is to send your regulator to one of the large regulator service centers that specialize in the repair of regulators, hydrostatic testing of tanks and servicing of other scuba accessories. Your regulator can be mailed in, serviced and returned in less than two weeks. Still a third option is to send your regulator back to the factory where it can be overhauled by personnel who generally have every conceivable replacement part at their disposal.

The most important thing to remember about getting your regulator repaired, cleaned or tuned is that it should be done *early* in the season. Don't go in the water if your breathing machine isn't performing perfectly. 



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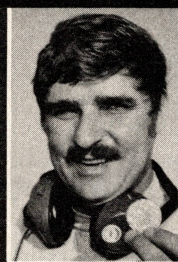
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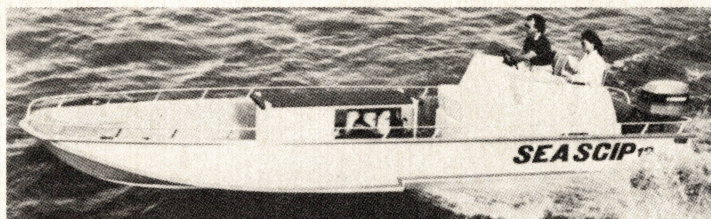
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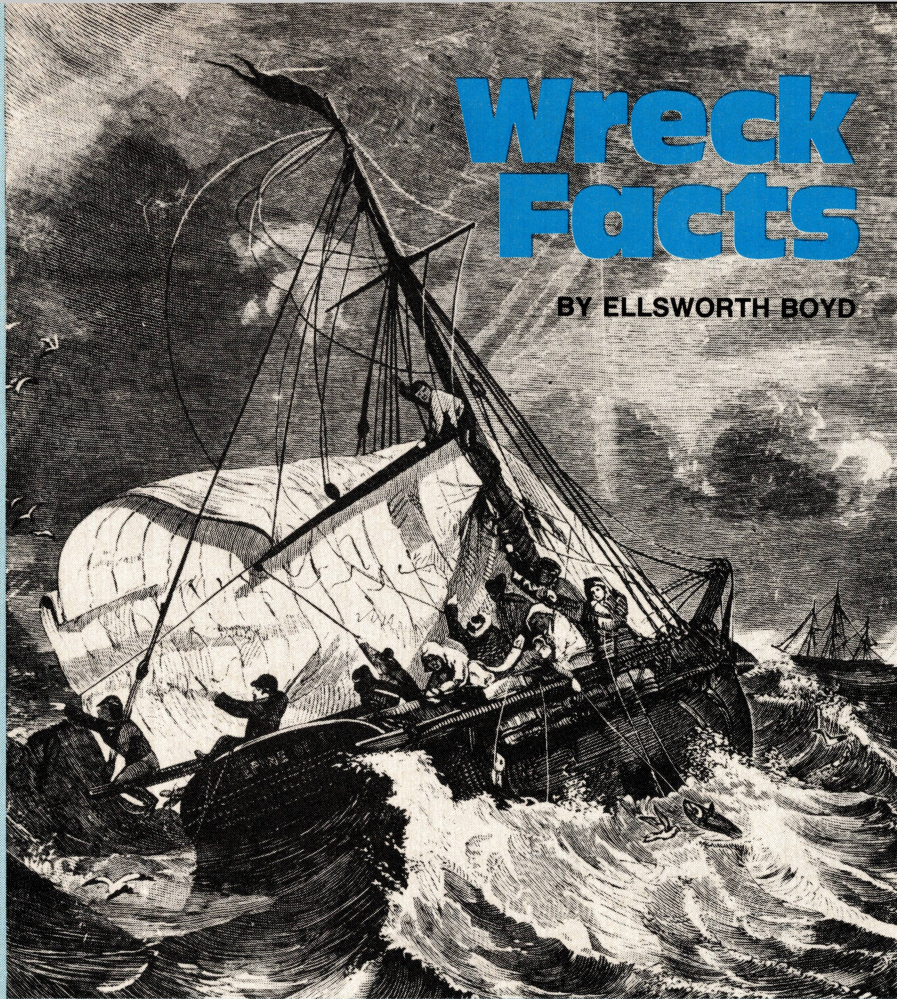
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Wreck Facts

BY ELLSWORTH BOYD

Uncovering clues that might lead to the location of a sunken ship can be difficult and frustrating if the vessel sank far from shore at night during a storm. Such was the fate of the *Dean Richmond*. A Lake Erie steamer, the *Richmond* sank in a raging storm about midnight on October 10, 1893, purportedly carrying a secret bank cargo of \$141,000 in gold bullion. There were no survivors and the reported location of the loss has varied over the years.

A researcher must use every trick of the trade and probe extensively into every possible source in order to authenticate facts and dispel rumors. Such is the task and obsession of American Airlines pilot Jack O'Keefe from Marseilles, Illinois. He has searched for the *Dean* for three years and compiled a file over four inches thick. He has started a book about the intriguing vessel and continues to search for the elusive steamer during the summer months. Jack writes: "There were four ships commissioned the *Dean Richmond*, named after the president of the Pennsylvania Railroad, so I had my work cut out for me from the start. I ran into a lot of contradictory information on the treasure ship and ended up with complete histories of all four *Dean Richmonds*! I experienced mixed emotions last summer when two other divers and I descended 140 feet to what I thought was the gold-laden wreck. But she turned out to be the *John J. Boland*, a Great

Lakes freighter that sank in a gale in 1932. She was totally intact so we think we were the first to discover the 51 year old wreck. This in itself was a thrill. Meanwhile, I'll continue my search for the *Dean*." Jack can be reached at: Route 2, Box 248, Marseilles, IL 61341.

Melanie Boyd, Aurora, Colorado, writes: "I made my very first wreck dive on the *Oro Verde* in the Cayman Islands, and it was my greatest thrill in diving. Sunk off Seven Mile Beach in May 1980, it is now one of the most popular dive sites in the Caymans. The ship is 180 feet long and the water depth is 50 to 60 feet, so you get a reasonable amount of diving time on her. I am looking forward to another dive on this wreck in the future."

Frank Hittell, Walnut Creek, California, also praises the *Oro Verde*. "The ship is in the sand, listing on its port side," Frank says. "She creates a great backdrop for a variety of underwater photography. The *Oro* is getting some decent coral growth on her now and lots of fish are hiding in her nooks and crannies." Frank has some nice shots of the vessel if anybody is interested. His address is: 140 Flora Avenue, Unit 241, Walnut Creek, California 94596.

If North Carolina divers haven't seen Bill Lovin's film, *Beneath The Killing Sea*, they should make every effort to do so. The 27 minute documentary portrays an exciting account of North Carolina's Graveyard of the Atlantic where over

2,000 ships have been lost. Divers in the film explore three sunken American tankers: the *Papoose*, *John D. Gill* and *W.E. Hutton* and the German submarine *U-352*. The underwater footage is exciting and includes exploration inside the superstructure and close-ups of curious barracudas and a 10 foot shark outside the wrecks. Divers may contact Bill at: P.O. Box 2242, Chapel Hill, NC 27514.

Jim Jenny, Saunderstown, Rhode Island, says that he has just finished entering 5,739 shipwrecks into his computer. These are lists of New England wrecks on computer disks which Jim says is the only way to go for the serious researcher/writer. A writer, diver and historian, famous for his book, *Diver's Directory of Shipwreck Research*, Jim has made a kind offer to SKIN DIVER readers. "I am more than willing to share data with other dedicated wreck diver/marine historian types," Jim says. "Have them include a stamped, self-addressed envelope and write to me: P.O. Box 144, Saunderstown, RI 02874." Jim made a nice closing comment which captures the major concept of *Wreck Facts*: "We all have a common interest," Jim says. "I can't see hoarding all my information as long as it can be helpful to a fellow diver. As wreck enthusiasts, our common interest draws us closer together."

Personally, I'm being drawn to Truk Lagoon by the fact that it was 40 years ago last February that an American naval task force attacked Truk Island in the Carolines and sank 41 Japanese ships. Klaus Lindemann, Ludwigshafen, West Germany, author of the book, *Hailstorm Over Truk Lagoon*, returned to Truk in February to see if he could locate more wrecks. He made many previous visits there while writing his extensive account of the battle and interviewing witnesses of the Truk Island attack.

Lindemann wrote his book in three parts. Part one gives historic documentation including Japanese plans for the island's defense and the American strategy for attacking it. The code name for the attack was Operation Hailstorm, specifically designed to destroy enemy shipping, aircraft and installations. Part two describes what can be found on Truk today. Interviews with dive guide Kimiuro Aisek, who was a teenager and eyewitness of the attack, convey graphic reality to the conflict that turned the tide of the war in the Pacific. Part three interests divers the most and includes details and photos of the wrecks. It is actually a diver's guide and can be used before each descent to familiarize the diver with what he will encounter. Lindemann says, "The gap in information that once existed on the wrecks of Truk and the attack on the island has been closed. The history of Operation Hailstorm, Kimiuro's story and the wrecks have been recorded, never to be forgotten. If interested, you may order the

(Continued on Page 16)

Alan Kaplan

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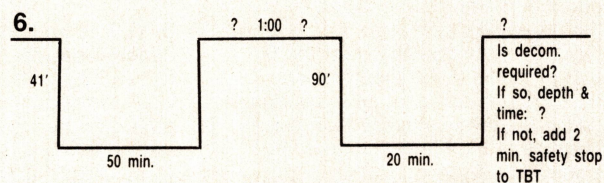
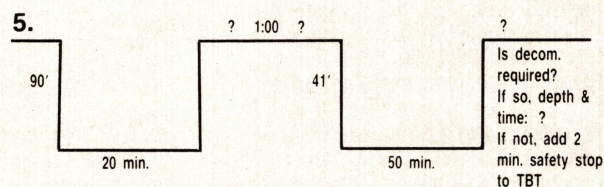
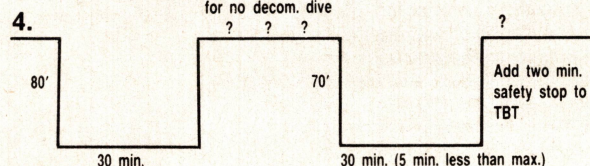
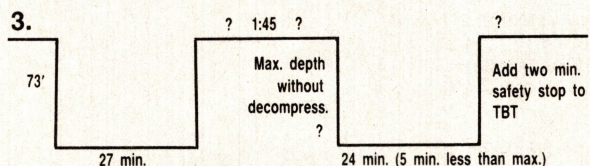
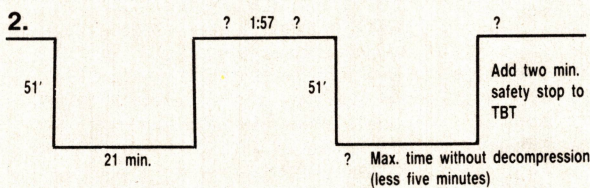
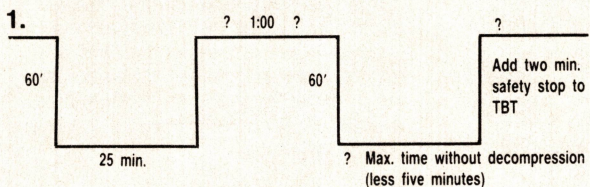
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Scuba Quiz

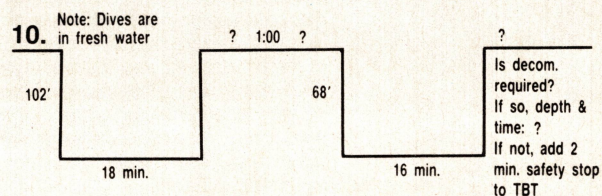
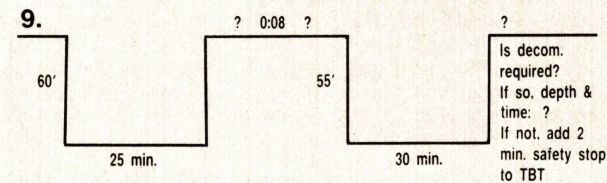
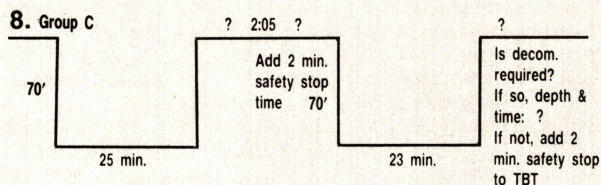
Category: Dive Tables Update

By Dennis Graver

To avoid decompression sickness (DCS), current recommendations for dive table usage require: (1) Not pushing the tables to their limits, and (2) Performing a safety decompression stop on all repetitive dives in excess of 40 feet. Review your dive table skills and see if you can incorporate the two rules above into your calculations accurately. For each problem, reduce the no decompression limit for each dive by five minutes and include a two minute safety stop during all repetitive dives. Safety stop time is to be added to the Total Bottom Time (TBT) of the dive. The answers are on the next page. Note: Complete all blanks in the dive profiles. Dives are at sea level unless otherwise noted.



7. What rule of repetitive diving is illustrated by questions 5 & 6?



Scuba Quiz

Answers: Dive Tables Update

1. E, D, J and 31 minutes. 60'/25 results in a Group E designation. A one hour surface interval (SI) attains Group D, and that designation has an adjusted no decompression limit (NDL) of 36 minutes at 60 feet. Subtracting the 5 minute safety margin, 31 minutes is permitted, *not* including the safety stop time. Adding 2 minutes for the stop time gives a final dive schedule of 60'/57 and a J ending group designator.

2. E, D, J and 31 minutes. This is exactly the same problem as question 1, except that the numbers have been changed to make it appear to be different. When a number is exceeded in the tables, the next larger one is to be used: 51 feet requires use of the 60 foot schedule. Even though nearly an hour longer was spent on the surface during the dives in question 2 than in question 1, the ending group is the same.

3. G, E, J and 60 feet. A schedule of 80'/30 gives a Group G designation, which changes to Group E after the 1:45 surface interval. For 24 minutes of Actual Bottom Time (ABT) plus 5 minutes of safety margin, the deepest depth which allows at least 29 minutes of bottom time for a Group E diver is 60 feet. The ending repetitive group after the 60' dive is J.

4. G, 2:59, C and J. The first dive ends with a Group G designation. To dive to 70' for 30 minutes plus 5 minutes of safety time, a group designation is needed which permits at least 35 minutes of diving at that depth. That

group is Group C, and to attain it from Group G requires a minimum SI of 2:59. The final repetitive group is J.

5. F, E, K and no. 90'/20 results in a designation of F. A one hour SI leads to group E. An E diver going to 41' (50') for 50 minutes is allowed 62 minutes of Actual Bottom Time and has a Residual Nitrogen Time (RNT) of 38 minutes. Total Bottom Time (TBT) or the sum of ABT and RNT equals 88 minutes. Adding 2 minutes of safety stop time gives a schedule of 50'/90 and an ending group of K with no required decompression.

6. G, F, L and 10'/18 decompression. 50'/50 results in Group G after the first dive. One hour later we reach Group F. If a Group F diver, who has 24 minutes of RNT, spends 20 minutes at 90', the TBT is 44 minutes. But, the 5 minute safety margin needs to be included. Since the no decompression limit was exceeded, the safety time is *added* to the TBT, requiring longer decompression and increasing the margin of safety. Of course, all dives should be planned as no decompression dives.

7. For a series of dives, the depths of the dives should proceed from deepest to shallowest. Compare questions 5 and 6. Note that the dive schedules are identical in each. The order of dives is the only difference. The first series is well within the no decompression limits, but the second series leads to a hazardous situation. Always make the deepest dives first.

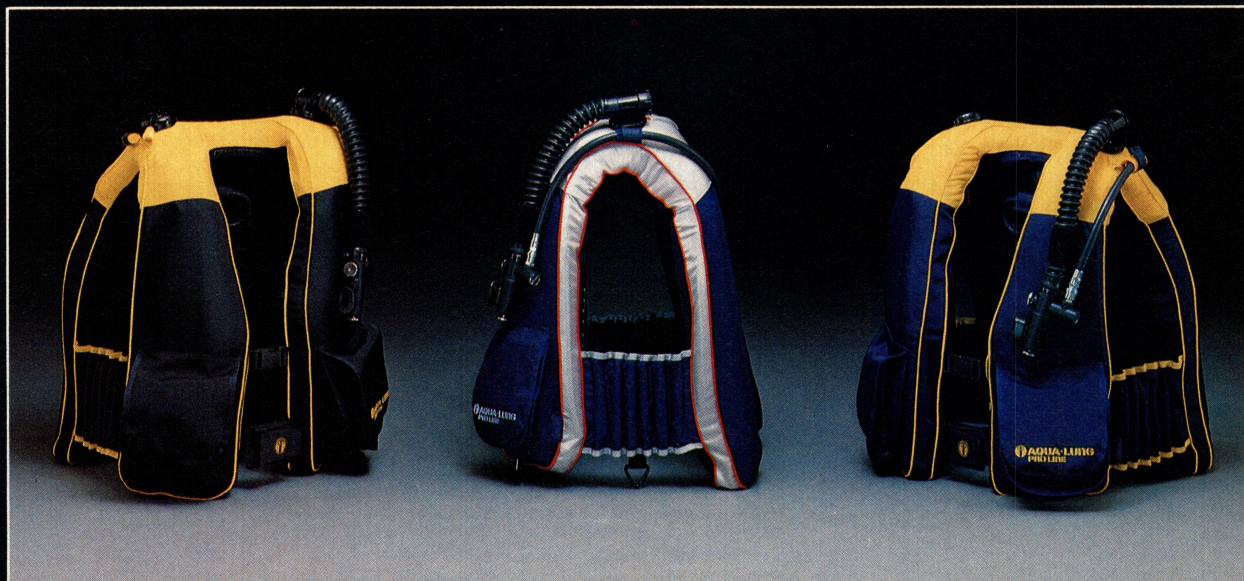
8. I, E, K and 10'/8 decompression. The first dive is a repetitive dive. 70'/25 plus 15 minutes RNT for a Group C diver is 70'/40 plus 2 minutes of safety stop time for a total of 70'/45, resulting in Group I. A 2:05 surface interval leads to Group E, which has an RNT of 26 minutes at 70 feet. If 23 minutes of ABT are spent at 70', the TBT is 49 minutes, not requiring decompression, *but* the addition of the 2 minute safety stop time to the TBT does make decompression at 10 feet for 8 minutes *required*.

9. The ending group is I, and no decompression is required. When the SI between dives is less than 10 minutes and the dives are to the same or next greater depth, the correct procedure is to ignore the SI, add the ABTs of the two dives, and use the deepest depth for calculations. However, this practice is not recommended and is *not* the same physiologically as remaining at depth for the entire bottom time. At least 30 minutes between dives is a good practice.

10. G, F, J and no. Technically, the 102 foot depth in fresh water is equal to only 99 feet of sea water, so the dive schedule is 100'/18 versus 110'/18. However, depth gauges are not accurate enough to allow such fine discrimination at such depths, so the conservative approach is preferred.

In spite of all the studies and information on decompression sickness, one hard fact stands out and deserves the awareness of every diver: Decompression physiology is a mystery. It is far from understood. Findings made with ultrasonic bubble detectors show bubble formation within the limits of the tables. It is important to adhere to the practices emphasized in this quiz—not pushing the limits of the tables and making safety decompression stops. Until we know more, incorporate these procedures for your safety and well being. If you had difficulty with the dive table computations, consider some refresher training for the coming diving season....

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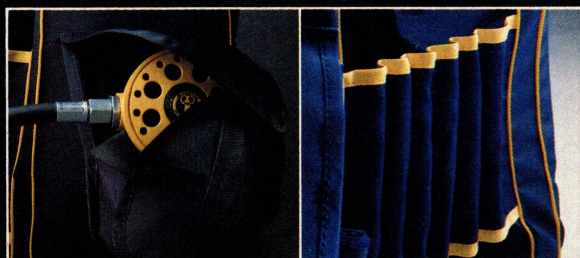
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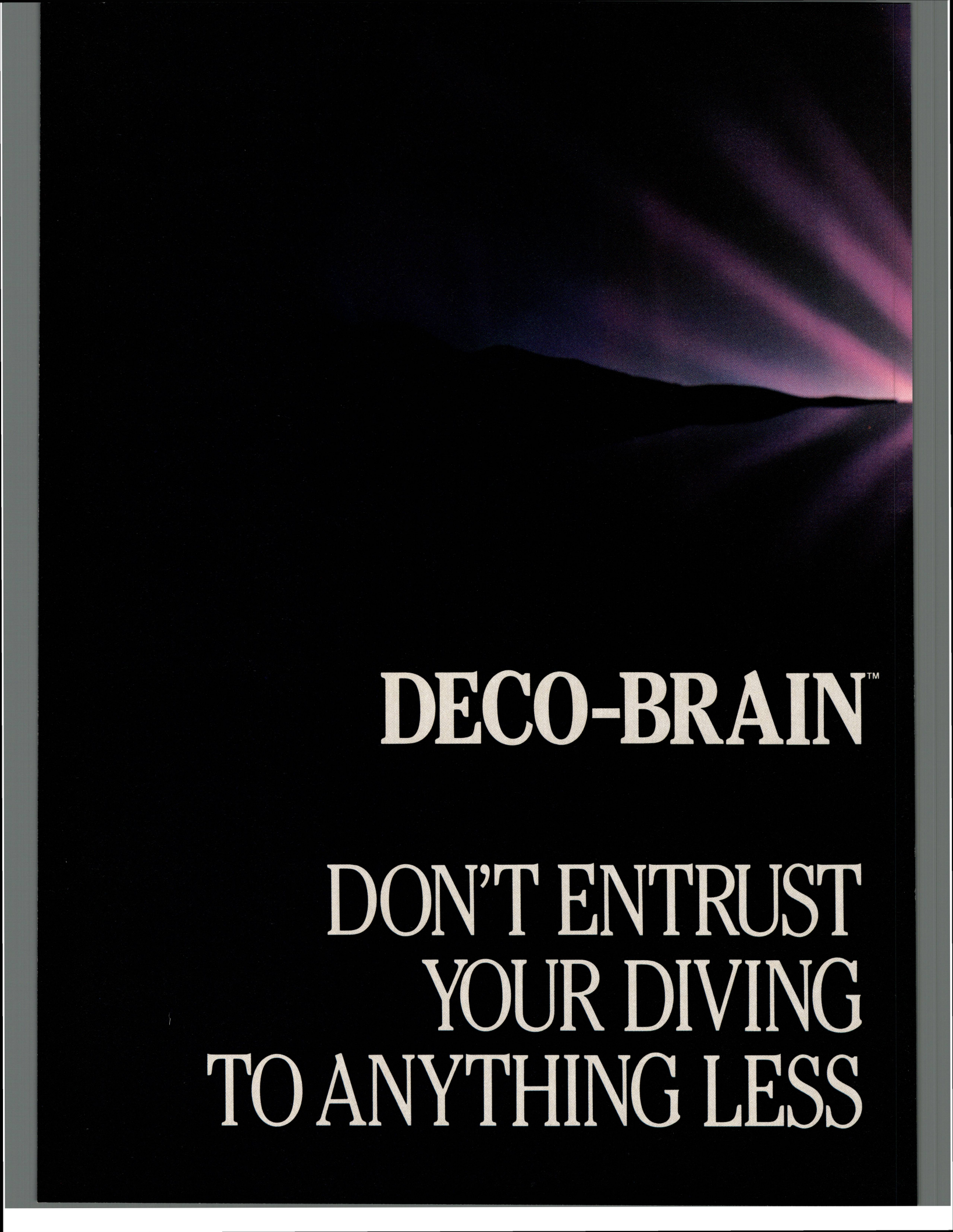
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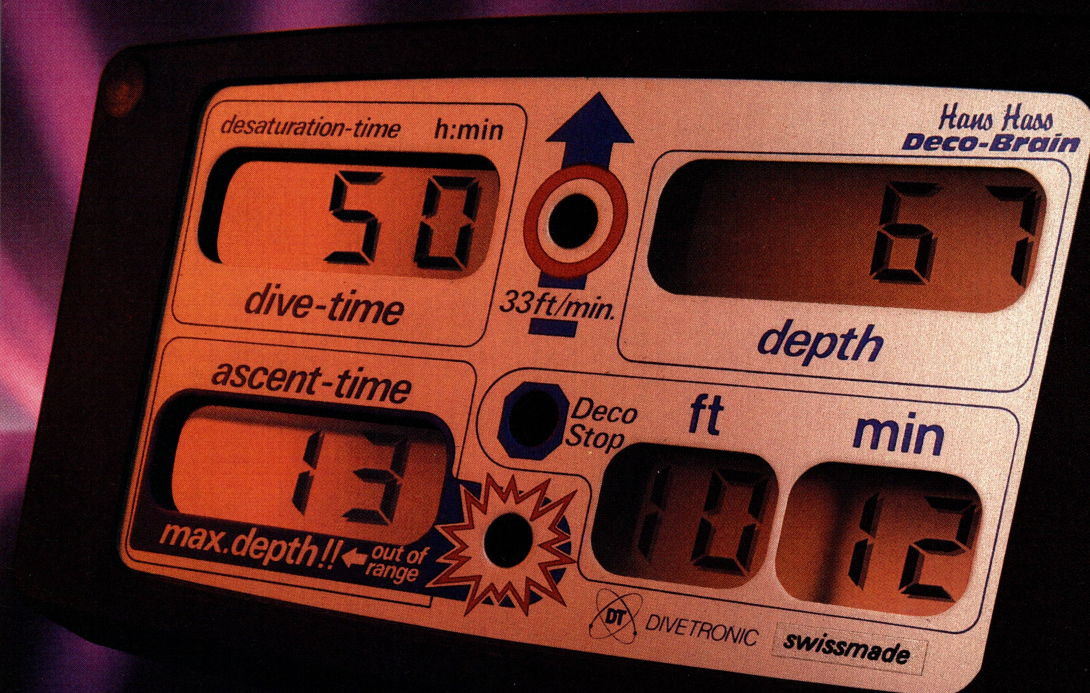
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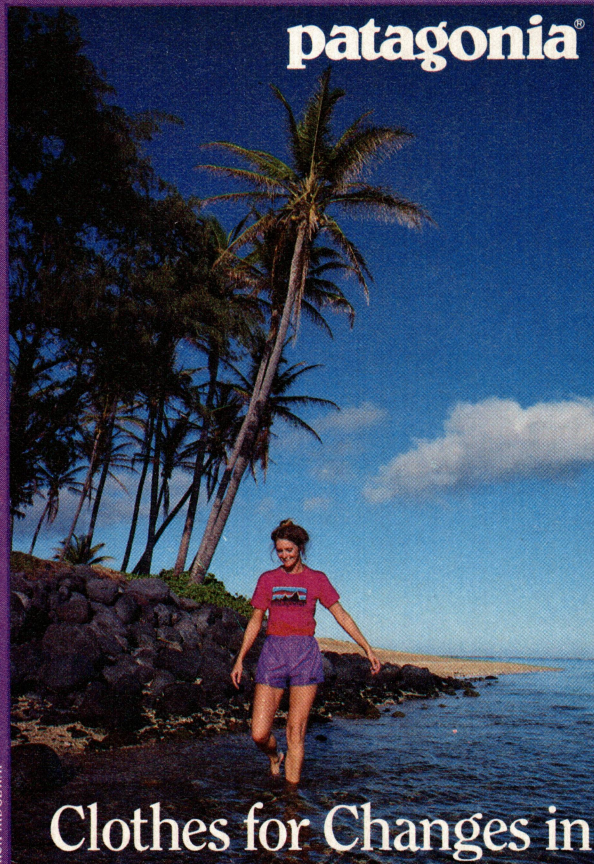
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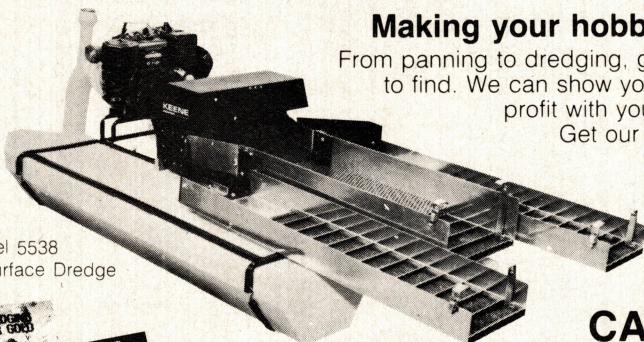
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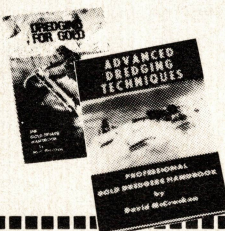
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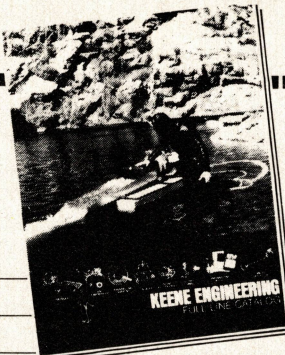


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WRECK FACTS

(Continued from Page 8)

book from: Maruzen Asia, 5-9F, Block 7, Ayer Rajah Industrial Estate, Republic of Singapore 0513. Paperback, \$17; hardback, \$22.

Steve Hopkins, Huntsville, Texas, writes: "I'm currently in the Texas state prison for a mistake I made and I have only eight months left before I will be out.



photo/Frank Hittell

Oro Verde

I'm from Tampa and was an active diver in the Gulf of Mexico and Florida Keys. I'm trying to research a shipwreck off Vlieland Island, North Sea, Netherlands, called *HMS Lutine*. The ship is a British frigate sunk in 1799 with \$8,000,000 in gold and silver aboard. Can you help me with my research?"

Yes, Steve, I can give you a little more information on the *Lutine*. The 32 gun British ship's gold and silver was aboard to pay the British troops who were fighting Napoleon. The saga of this wreck has continued for over 150 years. She left Yarmouth bound for an island off the Dutch coast, but ran into fierce gale force winds. Nobody knows why the captain didn't shorten the sails when the winds arose, but there are rumors the ship's officers were drinking in their cabins. She hit shoals and sank instantly. Lloyd's had insured the wreck and paid off the claim. Even today the ship's bell hangs in the Lloyd's of London offices. The Dutch salvaged about 84,000 British pounds in coins and ingots, but there are purported to be over 500 gold and silver bars still aboard. Over one million tons of sand were sucked up during salvage, leading current day treasure hunters to believe that the ship lies beneath deep sand that fills in constantly during storms. Also, cannons and heavy equipment lay over the bullion room, forcing the vessel to sink even deeper. Some say there were jewels aboard, but this may be just a rumor.

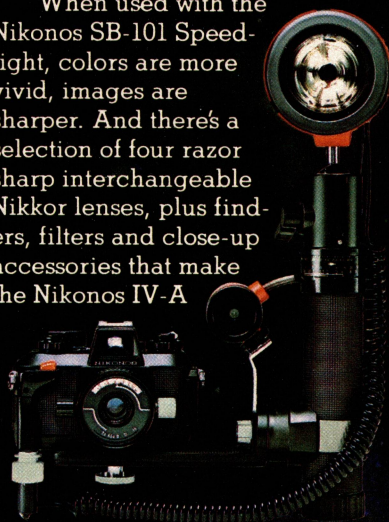
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Diver's Calendar

April 5 North Atlantic Wreck Divers of Delaware Scuba Swap Meet, sponsored by the DuPessda Skin & Scuba Diving Assn. and the Delaware Underwater Swim Club. Free admission to the public and dealers, at the Delaware Assn. of Police Bldg., Wilmington, DE. (Contact: Scott Jenkins, P.O. Box 7743, Newark, DE 19714; (301) 392-3690)

April 7 Sea State '84 underwater educational afternoon and film festival at Masonic Temple, Portland, OR. (Contact: Tide Riders Scuba Club, P.O. Box 774, Tualatin, OR 97062)

April 7 Seventh Annual Scuba Thon, conducted by the Society of Underwater Engineers at Stevens Institute of Technology in Hoboken, to benefit the Leukemia Society of America's Northern New Jersey Chapter. (Contact: Leukemia Society of America, Northern New Jersey Chapter, 1855 Springfield Ave., Maplewood, NJ 07040)

April 13 Dive to Adventure film presentation with Jack McKenney at Sandburg Junior High School, Elmhurst, IL. (Contact: Underseas Scuba Center, 626 N. Addison Ave., Villa Park, IL 60181; (312) 833-8383)

April 15 Eleventh Annual Equipment Exposition and Pre-season Sale. Manufacturer exhibits, speakers, movies and door prizes. (Contact: New England Divers, 131 Rantoul St., Beverly, MA 01915; (617) 922-6951)

April 20-22 Oceanfest, Miami, Florida. (Contact: International Oceanographic Foundation (305) 361-5786)

April 27-29 18th Annual Greater NYC Underwater Exposition—Beneath The Sea (formerly Dive to Adventure), at the White Plains Hotel and Marymount College. Seminars, workshops, special events and exhibits. (Contact: BTS, P.O. Box 644, Rye, NY 10580 or A. Zigahn (914) 961-2088)

April 28 Underwater '84 symposium, Copley Plaza Hotel, Boston, MA. Underwater film review at John Hancock Hall. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, MA 02117)

April 29 Fourth Annual Underwater Easter Egg Hunt to Fight Leukemia at La Jolla Shores, La Jolla, California. (Contact: Kim Skaalen, 4423 Brighton Ave., Ocean Beach, CA 92107)

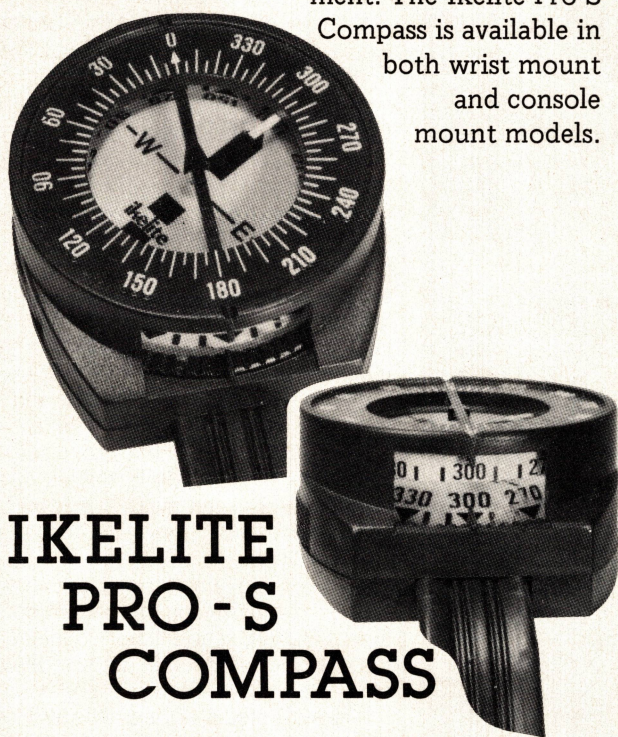
April-August Seamark 1984 New England Photo Contest (underwater and topside subjects). (Contact: Andrew Martinez, P.O. Box 770, Ipswich, MA 01938)

May 4-6 Our World-Underwater, Chicago, IL. (Contact: Leroy Winbush (312) 527-4478)

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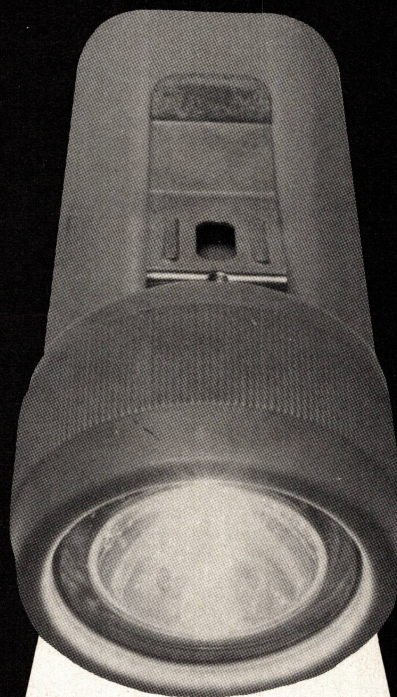
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Film Festivals 'n Symposiums

OUR WORLD-U/W

Our World-Underwater, the diving seminar and film festival, celebrates its 14th year May 4-6 in Chicago. The new location for the program will be the Hyatt Regency Chicago.

Our World-Underwater festivities commence Friday evening with a cocktail party and reception in the exhibit area. All weekend the exhibit hall will feature 200 booths displaying the latest in diving equipment, diving and photographic techniques, diving travel, certification programs, wreck artifacts and more.

Saturday morning concurrent seminars begin in five rooms. Each will feature six half-hour verbal and visual presentations, given by prominent leaders in the diving world. Topics encompass underwater medicine, shipwrecks, dive destinations, marine life, underwater photography and other subjects.

For ticket and special room rate information, please write Our World-Underwater, P.O. Box 4428, Chicago, Illinois 60680. ✉

OCEANFEST '84

Oceanfest '84, a three day celebration of our oceans' recreational benefits, will be held April 20-22 at Miami's Dinner Key Coconut Grove Exhibition Center. In addition to more than 200 booths displaying ocean travel exhibits, scuba equipment and services, Oceanfest will feature an island seafood festival, marine arts show, the Rick Frehsee School of Underwater Photography, live island music and four continuous-running theaters with over a dozen different film and audio/visual presentations. Thousands of dollars in door prizes will be given away in addition to a grand prize trip for two to Australia by Pan Am World Airways.

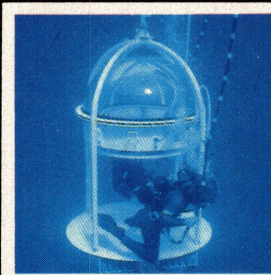
Highlighting the three day exhibition will be appearances by recording star Jimmy Buffett, Jean-Michel Cousteau, astronaut Scott Carpenter and underwater cinematographer Jack McKenney.

Jimmy Buffett's appearance will be as a representative of the Save the Manatee Committee for which he serves as chairman. A portion of Oceanfest gate proceeds will be donated to the committee for further education and research about this endangered marine mammal.

Special pre- and post-show island vacations with optional diving packages are being offered by AT Reef Ventures.

Oceanfest is part of Oceans Miami '84, a nine-day festival of the sea sponsored by the International Oceanographic Foundation and Planet Ocean. For further in-

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Photos by LARRY CUSHMAN

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If you want to be a professional diver, contact our Admissions Department. Use the Reader Service Card or call us collect at (713) 661-0033. You'll be glad you did.

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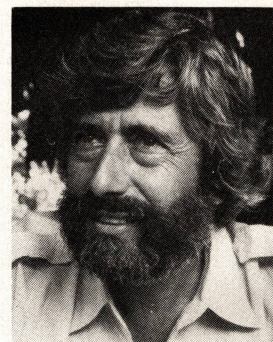
1149 Hingham St.,
Rockland, MA 02370, (617) 871-1400.

FILM FESTIVALS

formation about Oceanfest or Oceans Miami '84, contact Planet Ocean at 3979 Rickenbacker Causeway, Virginia Key, Florida 33149; (305) 361-5786. 🐟

SEAVIEW '84

Jean-Michel Cousteau, executive vice-president and director of the Cousteau Society, will be the featured guest of the Seaview '84 film festival on Saturday,



May 12 in St. Louis, MO. Two outstanding programs have been scheduled. Cousteau will lecture on various topics such as the Amazon expedition and present a Cousteau Society film. Other events will include a new film on Cayman and various lectures with slide presentations by Paul Humann. Dee Scarr will present several lectures and slide shows on her relationships with marine life.

For information and tickets contact Seaview '84, Lambert Field, Box 10221, St. Louis, MO 63145; (314) 867-1900. 🐟

HUPS FESTIVAL

The Houston Underwater Photographic Society (HUPS) will hold its 1984 Film Festival and Photo Competition June 9 and 10 at the Hyatt Regency Hotel, Houston, Texas.

Sponsored jointly by HUPS and the Kenlee's Scuba Centers, this event will include a large exhibit area, free seminars on diving and a free introduction to scuba in the Hyatt's pool. In conjunction with the festival, HUPS will host a two day intensive underwater photography seminar with hands-on training conducted by Stephen Frink.

The photo competition will be open to one and all. Categories include novice slide, open slide, novice print and open print. Deadline for entry is May 31.

The film festival will feature the most recent offerings of nationally recognized underwater cinematographers. Stephen Frink will present a multiple-projector sound-synched slide program. Also included in the show will be the work of some of Texas' talented artists. Houston's own Ron Coley will be highlighted

(Continued on Page 32)

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A black and white photograph of three divers underwater. They are wearing Sherwood regulators. The diver in the foreground is wearing a regulator with a 'MAGNUM' logo. The diver in the middle is wearing a regulator with a 'BRUT' logo. The diver in the background is wearing a regulator with a '4000' logo. Bubbles are visible around the divers.

Sherwood, overwhelming favorite of underwater experts.

More and more divers are getting hooked on Sherwood. And that's a good reason for you to join them with your own Sherwood regulator.

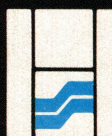
The newest Sherwood regulator is the economical BRUT®. You'll like the price; love the features such as a dry sealed first stage, and three low pressure ports plus one high pressure port. Simple, rugged design and minimal maintenance make it a natural where regulators get high usage.

Or pick the lightweight, dependable Magnum® and breathe easy in silted or sandy water. Positive air pressure seals the balanced first stage, keeping it dry and clean without messy silicone, grease or oil. For cold water diving, there's the Magnum Blizzard® that uses your breath to minimize freeze-ups. There's no need for batteries or complex hardware.

For classic luxury, the smartly styled 4000 Regulator offers four low pressure ports and one high pressure port plus a balanced piston in the first stage. Extra-rugged, extra-large yoke and oversized exhaust tee make the 4000 easy to use and easy to breathe.

To complete the selection, Sherwood offers five octopus second-stage regulators and a Hookah second-stage regulator.

See all these Sherwood regulators and other Sherwood dive products at your professional dive store. One good look and you'll be hooked.



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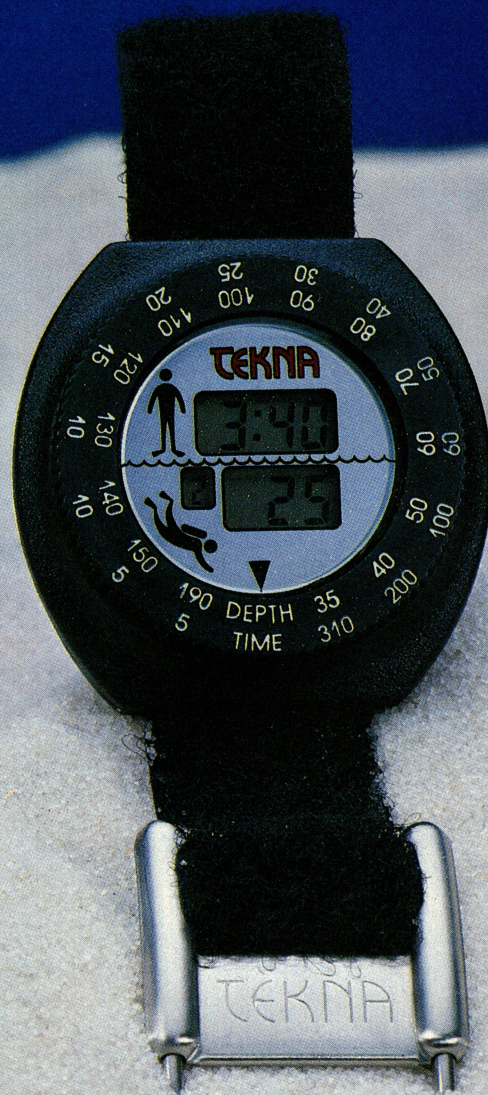
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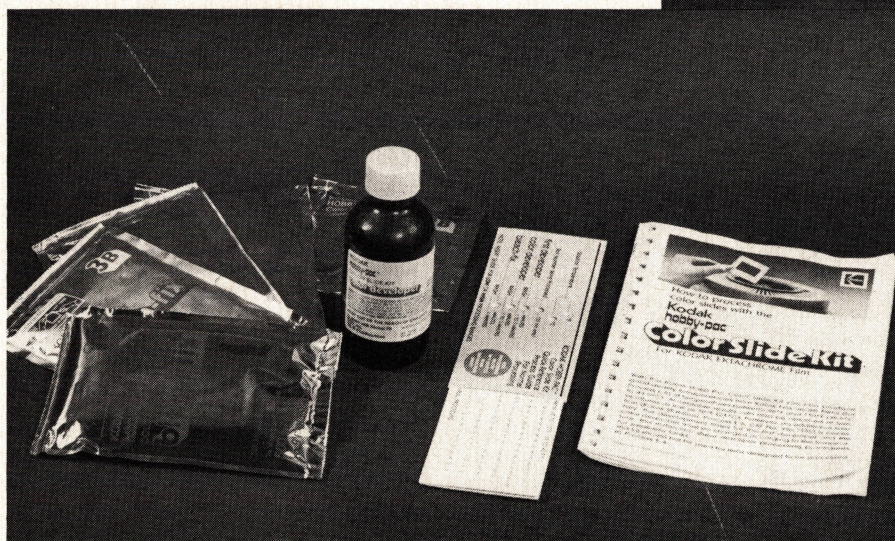
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DEVELOP YOUR SLIDES ON LOCATION

Kodak's Hobby-Pac E-6
Color Slide Kits Let You
Find Out Before It's Too Late!

TEXT AND PHOTOGRAPHY
BY JIM AND CATHY CHURCH



Hobby-Pac contains directions, development time calculator, liquid and dry chemicals.

Have you ever returned from an expensive dive trip to an exotic, far-away location, only to find that none of your color slides turned out? It may have been an unnoticed mechanical problem, bum exposure advice or whatever, but something was consistently wrong! And what hurts is knowing that you could have identified and solved the problem if you could only have processed your first few rolls of film.

THE KODAK HOBBY-PAC

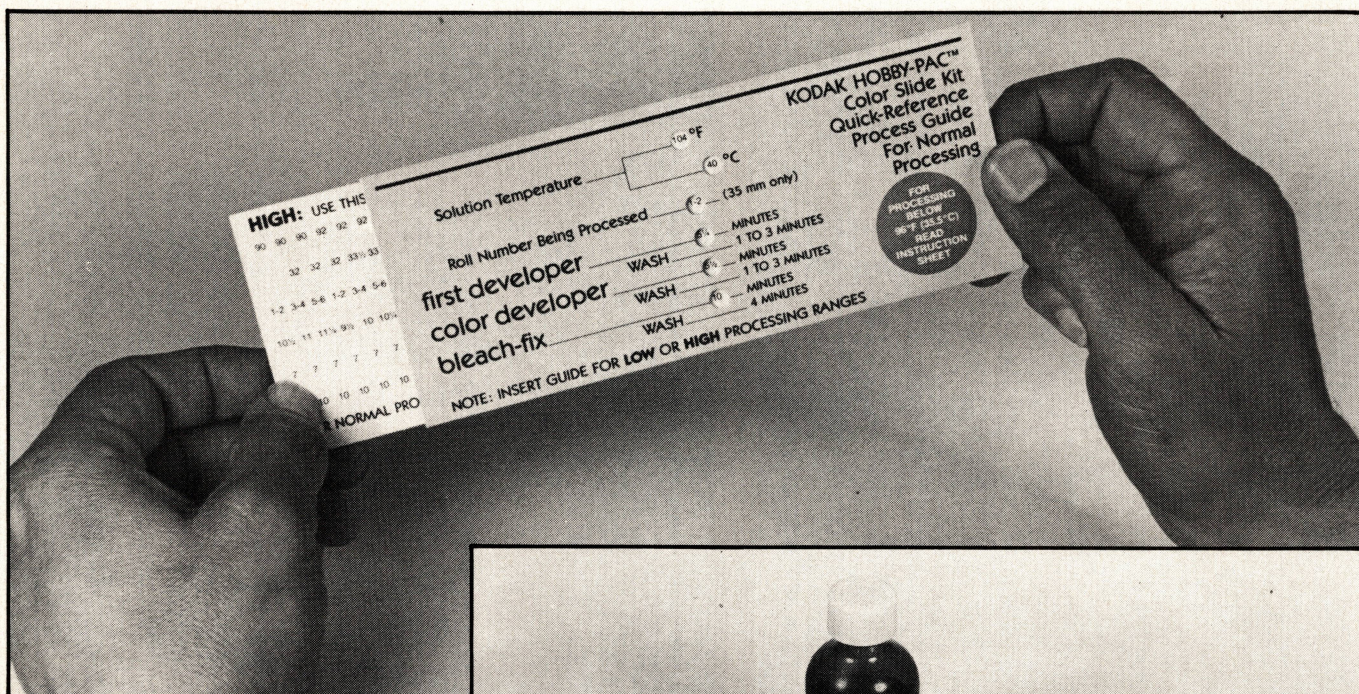
Seeing those first few rolls, or even more, isn't that difficult! With the Kodak Hobby-Pac Color Slide Kit (\$11.45), you

can process any Ektachrome color slide film, either consumer or professional, in your bathroom or the galley of a boat. The materials and supplies are relatively inexpensive, the procedures are surprisingly easy and your results are fully professional, good quality transparencies. The new Hobby-Pac is much simpler than any previous Kodak Ektachrome slide processing kit.

The kit comes in a small box measuring 7.25 x 5.75 x 2.5 inches, with a total weight of 26 ounces. The contents consist of 14.8 ounces of chemicals in one small bottle and five foil packets, 15 pages of excellent directions and a card-

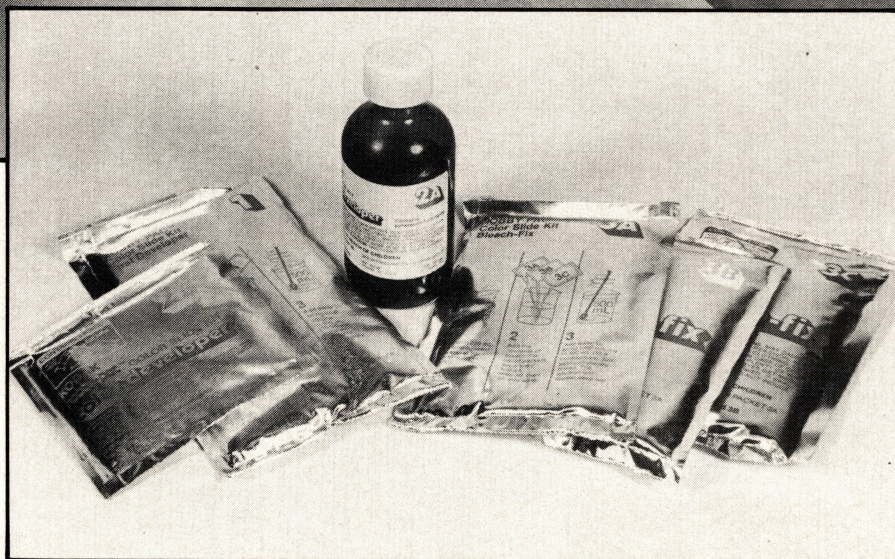
board slide guide for determining development time. The rated capacity of the kit is eight rolls of 20 exposure 35 mm film or six rolls of 36 exposure film. However, if you process all your film within a few days after mixing chemicals and you store your chemicals in full, tightly capped containers, you can exceed the rated capacity. Because the color and exposure shifts slowly from good to bad, you can process as long as the results are pleasing to your eye.

You can monitor your processing with test strips. Simply take 20 exposures of a multi-colored subject with purples, oranges and greens, all with the same lighting and exposure. When rewinding, don't wind the leader all the way into the cassette. Pull it out to the area where your exposed images would start and cut it off so that just a quarter inch of film protrudes. Mark this cassette! When you are in the dark and have loaded a roll of film onto a developing reel, pick up the test cassette. Pull out a strip of film from the test roll and cut off about an inch of film. Tape this piece onto the end of the loaded roll of film (placing the tape on the non-emulsion side) or (depending on the design of the reel) simply insert it into the center of the reel. If you are only processing one roll of film, place the test strip on the empty reel. This gives you a comparison between each processing run.



The Quick-Reference Process Guide (above) allows the user to determine the proper time required for each step of the developing process according to the temperature of the solutions used.

The Hobby-Pac comes with one developer in liquid form, but the other chemicals must be mixed by hand. The amount of chemicals provided will process about eight rolls of 20 exposure or six rolls of 36 exposure film.



MIXING AND STORING CHEMICALS

You need three containers for the chemicals. We use one liter plastic Air-Evac chemical storage bottles for half-liter quantities. The excess capacity makes it easier to handle the containers without spilling. During processing, the accordion-ribbed sides allow rapid heat exchange for quick temperature adjustment. During storage, they are collapsible and enclosed air is minimized, which extends shelf life. And when traveling, they are light and easy to pack. However, you can use any glass or plastic container—such as mayonnaise jars or beer bottles if you don't mind scrounging through the resort's trash bins. If you won't be moving the full containers around, you don't need to find the lids. Pieces of plastic baggie held over the tops with rubber bands will do for a few days. If you use narrow-necked bottles, you will need a small funnel during processing.

Mixing is easy. Start with a cup of fresh water in your mixing vessel, pour in the

Hobby-Pac chemicals as directed, then fill to a half liter (16.9 ounces) with water. If you use collapsible bottles, you need a separate measuring container for mixing. If you use transparent glass or plastic bottles, you can mark the sides of the bottles and mix directly in them. Label lids and containers immediately. Avery labels and pencil marks covered with clear plastic tape survive hot water amazingly well. Grease pencil can also be used on most surfaces.

LOADING THE REELS AND TANK

You will need two film reels, a pint developing tank, a bottle opener (church-key type), scissors and either a dark bag or a darkened room. The film cassettes are opened with the bottle opener, the film leaders are cut off with the scissors, the film is threaded onto the reels, and the reels are placed inside the developing tank—all in total darkness.

A stainless steel tank and reel set are your best choice because a half liter (a lit-

MATERIALS

- Kodak Hobby-Pac
- Stabilizer or Photo-Flo
- Rubber gloves
- Dark bag
- Processing tank and reels
- Bottle opener
- Scissors
- Half-liter mixing vessel
- Funnel, optional but handy
- Three half-liter (16.9 oz.) containers
- Labeling system for containers
- Water bath to hold chemical containers
- Thermometer (accurate to + or - 1/2°F)
- Timing device
- Running or stored wash water
- Coat hangers or line to hang film
- Film clips or clothespins

tle more than a pint) of chemicals will completely cover both reels of film. Some plastic tank and reel systems we've seen require slightly more than a half liter of liquid to completely cover the top reel—even though some of these were described as being pint tanks by the sales-

person. Thus, a plastic tank may limit you to processing only one roll (on the bottom) of film at a time unless you mix two Hobby-Pacs at once. If you have a plastic tank, experiment with a half liter of water to see if both reels are covered.

A dark bag is made of black material, has dual light-tight zippers and openings for your arms. You open the cassettes and load the reels and tank with your hands and equipment inside the bag. However, in humid climates, your hands and the film may become damp with perspiration which can damage the film emulsion and make it almost impossible to load the film onto a reel. Work in a cool room if you load in a dark bag.

You may be able to darken the closet or bathroom enough for film loading at night. Sit in the darkened room for at least five minutes to let your eyes adjust to the dark. If you can see your hands, the room isn't dark enough. A buddy can hold a blanket over a door or window for the few minutes it takes you to load the film. Very small light leaks around the door won't affect your film if you keep your back to the door and shield the film so that no light strikes it. Once the loaded reels are safely inside the closed developing tank, you can turn on the lights.

Practice loading the film onto reels ahead of time at home! Use cheap black and white or outdated film. You won't be taking pictures with this film—it is for practice. Open the cassette, trim the leader and practice loading the film on

the reel in daylight so you can see what is happening. Practice until you can load the film on the reel correctly with your eyes shut. If the film buckles on the reel, the pictures will be ruined wherever the emulsion side of the film touches another layer of film. If you don't have time to practice, try using plastic reels as they may be easier to load.

CHOOSING A TEMPERATURE

With the Hobby-Pac system, you can process at temperatures from 70 to 110°F, but must maintain a constant temperature within a half degree during the first developer step. Because the processing time varies with the temperature chosen and the total number of rolls processed with the chemicals, a cardboard (sliding scale) reference guide is included. Align the scale for the temperature and the number of rolls being processed and the guide lists the processing times for each step.

Choosing the best temperature involves some important tradeoffs: For the most accurate color, Kodak recommends temperatures between 96 and 110°F. (If you process at less than 96°F, you add a fourth chemical step—Kodak Stabilizer, Process E-6—that must be purchased separately.) High temperatures make the film bluer; lower temperatures make the film yellower. Our test film processed at 94°F looked normal. Identical film processed at 76°F showed a slight yellow tint, but it wasn't objectionable. The amount

of yellow that you could tolerate would depend on your subject. Obviously, it would be no problem with many close-ups, but may reduce the intensity of certain blues or purples.

If you choose a temperature above room temperature, you will need a water bath—in a cooler, dishpan or sink—in which the containers and developing tank can be kept. Temperature in the bath can be maintained by periodically removing some of the water and then adding hot water. Aboard ship, even a small source of boiling water will suffice. The greater the difference between the temperature chosen and room temperature, the harder it will be to maintain a consistent temperature during developing.

Temperature also affects the total processing time. High temperatures require shorter processing times; at 110°F, total processing time is about 27 minutes. Low temperatures greatly lengthen processing time; at 70°F, total time is about 54 minutes. The shorter the processing time, however, the more critical the timing. At 110°F, for example, first developer time is only four minutes. Thus, errors in timing have a greater effect on development.

In your hotel room or on a boat where room temperature is about 85°F, a good temperature compromise (in our opinion) is about 92 to 96°F. This temperature range is relatively easy to maintain with hot water and gives reasonable processing times and good color. At home, with a water bath, we standardize at 100°F.

Front row, left to right: Hobby-Pac chemical packages, cardboard reference guide, color developer, digital watch, Ektachrome film, measuring container, thermometer, clothespin, film reels, bottle opener and scissors. Back row: Air-Evac containers, developing tank.

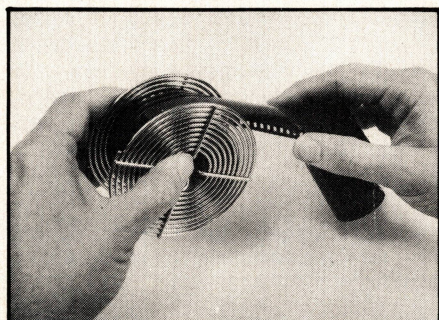


PROCESSING THE FILM

Processing is the easy part. All you do is pour the chemicals from the storage containers into the developing tank, agitate according to instructions and pour the chemicals back into the storage containers at the proper time. You do this with the lights on. Timing is summarized on the cardboard reference guide, and the only critical timing is for the first developer. Any timepiece will do, although a digital watch with a stopwatch mode is easiest to use.

To illustrate how easy processing is, let's assume a temperature of 94°F and that you are processing your first two rolls of film. Using the reference guide, the basic procedure is as follows:

1. Load the film onto the reels and place them inside the processing tank.
2. Bring storage containers and loaded processing tank to proper temperature.
3. Simultaneously start timing and pouring the first developer into the processing tank. Tap the tank to dislodge air bubbles, agitate and process for eight and one-half minutes, according to Hobby-Pac directions. Pour the first developer back into the storage container.



Practice loading the reel with old film.

4. Immediately fill the tank with wash water, tap, agitate and pour out. Repeat three more times.

5. You can now remove the lid from the tank if you wish, as the film may now be exposed to light without harming it. Pour in the color developer, agitate and process for a total of six and one half minutes. Pour the color developer back into the storage container.

6. Wash four times (see step 4).

7. Pour in the bleach-fix, agitate and process for a total of at least ten minutes. Pour it back into the container.

8. Wash six times (see step 4), or wash with running water for four minutes.

9. Pour in stabilizer and pour out after one minute.

10. Hang film to dry.

You will need at least two gallons of wash water, which can be stored in a clean trash can, or a reliable source of running water. If your fresh water supply is limited, you can use sea water for all of the washes except for the last two in step

HOBBY-PAC NOTES

There are four major differences between the new Kodak Hobby-Pac and the previous Kodak Pint E-6 kit:

1. There are fewer chemical steps. Reversal and color developer have been combined, bleach and fixer have been combined. The conditioner has been replaced by water wash and stabilizer has been eliminated at higher temperatures. The new steps are first developer, color developer and bleach/fix.

2. The kit is simpler, smaller and lighter. The foil packets take up less space than bottles and some chemicals appear to be more concentrated as they take up less space. The package dimensions of the new kit are only about one-fourth those of the old kit, and it weighs about one-third as much. The rated capacity of the new kit is three-fourths that of the old kit.

3. The new process requires 14 complete wash water changes as compared to six for the old process.

4. Kodak provides a set of temperature/time options rather than the previous single processing temperature of 100°F.



Film must be placed in tank in darkness.

eight. Filter the seawater with a darkroom or coffee filter. Add small amounts of boiling water (if necessary) to warm stored wash water. It is not necessary for the wash water to be at the same temperature as the chemicals; but the closer it is, the less the emulsion expands and contracts with temperature change. Too extreme a change can cause noticeable cracks (reticulation) in the emulsion. The rule is to keep all temperatures as close as possible.

STABILIZER AND PHOTO-FLO

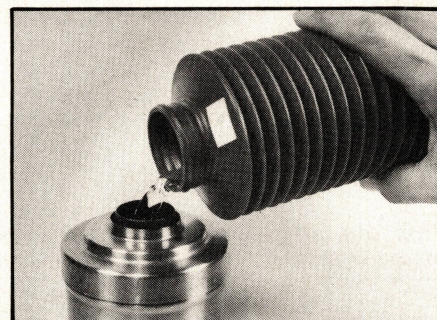
The Hobby-Pac is a three-chemical process at temperatures between 96 and 110°F. However, adding stabilizer as an optional fourth processing chemical reduces water spotting on your film and may add to its longevity. If you don't use stabilizer, you may need to use Kodak Photo-Flo 200 Solution to eliminate water spots. Between 70 and 96°F, however, the stabilizer is required.

Time and temperature are not critical

for either stabilizer or Photo-Flo: You pour the solution into the developing tank, tap, leave it in for about a minute and pour it out. Neither chemical is included in the Hobby-Pac; they are purchased in small bottles and require additional storage container(s).

PUSH AND PULL PROCESSING

You can increase (push) or decrease (pull) the effective film speed by two stops by changing the time in the first developer as specified in the Hobby-Pac directions. Thus, if you accidentally exposed your film for the wrong film speed, or if you needed to use a different film speed for special conditions, you can compensate during development. Ektachrome 64, for example, can be processed for ISO (ASA) 16, 32, 64, 125 or 250. The results are not as good, however, as with film exposed and processed for its normal film speed. You will notice a slight loss of density in the blacks, a color shift toward green, increased grain and some loss of sharpness in pushed film. In pulled film, you will notice loss of details in the highlight areas, a color shift toward red and an overall loss of color



Chemicals can be poured with lights on.

saturation. Film speed can be pushed by three stops, but this requires changing the dilution of the color developer.

DRYING THE FILM

After processing, remove the film from the reels and hang it up to dry. The drying area must be dust free—the bathroom is usually the best location. Keep the door and window shut because air currents carry dust. Ladies' hosiery hangers can be used to suspend the film from the shower curtain rod. Or, use clothespins to attach the film to a clothes hanger or cord. Attach a clothespin to the bottom of each strip of film to prevent curling.

If you ended with a water wash or Photo-Flo, use a film squeegee to eliminate water spots. If you ended with stabilizer, don't wipe the film at all or wipe only the non-emulsion side with a soft sponge.

Avoid the temptation to handle and inspect wet film. The emulsion is soft and you can't repair a scratch in its surface. When you first see the wet film, don't

(Continued on Page 42)

600 miles north of the Arctic Circle, a Canadian ice breaker cuts a trail in the search for the HMS Breadalbane.



Searching for a shipwreck under the Arctic ice is not for ordinary divers. Or ordinary watches.

Temperatures reach 50° below zero. The wind chill factor: -100°F. Ice floes are a constant hazard.

For Dr. Joe MacInnis, the conditions were perfect.

In this hostile world lay a unique treasure: the HMS Breadalbane, a three-masted British barque lost in 1853 during the search for the Northwest Passage. MacInnis was determined to find her.

Using delicate sonar, he was able to pinpoint the location of the vessel 340 feet below the surface, near Beechey Island. Divers discovered one of the most perfectly preserved shipwrecks found in any ocean.

In the Arctic, ordinary divers find it difficult to function. So do ordinary watches. For the past 15 years, Dr. MacInnis, the first to dive and film under the North Pole, has chosen one watch: the Rolex Submariner.

"I've worn it everywhere. From the North Pole ... to the Red Sea."

As for the future, there are still more explorer ships resting on the Arctic floor.

A fitting challenge for Dr. Joe MacInnis and his Rolex.

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FILM FESTIVALS

(Continued from Page 24)

with a screening of his San Marcos River chronicle, River of Innocence.

For complete information contact HUPS Festival, P.O. Box 270056, Houston, Texas 77277; (713) 661-6080. 🐠

WRECK ARCHAEOLOGY

The Atlantic Alliance for Maritime Heritage Conservation is sponsoring its first regional conference on shipwreck archaeology in Newport, RI, April 13-15. This meeting of sport divers and archaeologists is being held in association with the Seafarers Heritage Library of Woodstock, VT and the Armchair Sailor Bookstore of Newport, RI.

The major objective of the conference is to educate sport divers, shipwreck salvors, marine archaeologists and maritime historians about how they might work closer together by involving each other more in shipwreck projects. Discussion topics of a particular concern will include: the setting up of a regional computerized clearing house of shipwreck data, with the aim of making the information available to maritime researchers and sport divers all over New England; and the need to organize local shipwreck survey

teams made up of both sport divers and archaeologists for an assessment of historic wrecks on the New England coast.

The conference presentations will be on Saturday and Sunday at the Ramada Inn in Portsmouth, some 15 miles north of Newport. Special discount rates on hotel rooms will be available for the first 60 people who pre-register through the mail. Conference registration for the three-day program will be \$20 per person. Pre-registration mailed before April 10 will be only \$15. All paid up members of The Atlantic Alliance can register for only \$12.50.

All money orders and checks for the conference registration and Atlantic Alliance membership should be made out to The Atlantic Alliance for Maritime Heritage Conservation and sent to Jim Jenney, 30 Shadbush Trail, Saunderstown, RI 02874. Jenney will send out additional information as requested concerning accommodations and program details. He can be reached daily before 2:00 pm at (401) 295-1483. 🐠

BENEATH THE SEA

Beneath the Sea, the Eighth Annual Greater New York Underwater Symposium and Film Festival (formerly Dive to Adventure), will be held at the White Plains Hotel, White Plains, NY and Marymount College, Tarrytown, NY April 27-29. The event is sponsored by the Scuba Sport Rites Club, North American Hyper-

baric Center, New York College of Medicine, Prof. Diving School of New York and the U/W Society of America.

Dr. Sylvia Earle will be the master of ceremonies and the event will offer 10,000 square feet of exhibit space, 30 seminars and workshops, receptions and a photo contest. The Underwater Society's Northeast Diver of the Year will be named at the symposium.

For more information write to Beneath the Sea, P.O. Box 644, Rye, NY 10580 or call Armand Zigahn at (914) 961-2088. 🐠

DIVE TO ADVENTURE

Five Chicago area dive stores are presenting the Fourth Annual Dive to Adventure film show, with Jack McKenney, on Friday, April 13. The two hour presentation will be held at Sandburg Junior High School, 345 E. St. Charles Rd., Elmhurst, IL with movies beginning at 8:30 pm.

For tickets or information please contact one of the following stores: Black Magic Dive Shop, 202 E. Main St., Round Lake Park, IL 60073, (312) 546-4664; Prospect Dive Shop, 1709 E. Central, Arlington Heights, IL 60005, (312) 640-6128; Scuba Systems, 3919 Oakton St., Skokie, IL 60076, (312) 674-0222; The Gear Bag, 1605 N. Newland, Chicago, IL 60635, (312) 637-3467; Underseas Scuba Center, 626 N. Addison Rd., Villa Park, IL 60181, (312) 833-8383. 🐠

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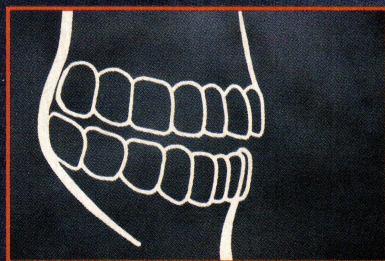
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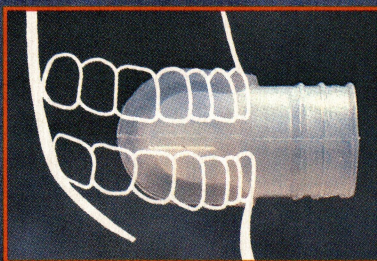


Natural Jaw Position



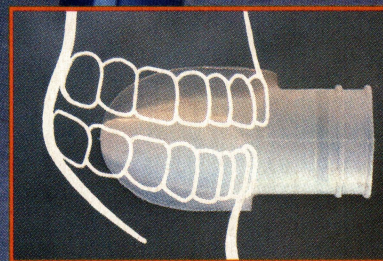
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Just as masks (prior to the Prismatic) ignored peripheral vision, mouthpieces (prior to the Ocean Pro) have ignored the anatomy of the teeth and jaw. The flaw in traditional mouthpieces is that they force the mouth into a teeth-clenching position...lower jaw forced forward, technically called "malocclusion", normal only when biting or tearing, but very

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fatiguing when sustained for extended periods.

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UNDERWATER CARNIVAL

The Third Annual Ed Gillette Memorial Educational Association Underwater Carnival and Symposium will be held Saturday, April 7 at State University of New York, Binghamton. The carnival will feature such games as the Susquehanna swim, the submarine dart throw, snowless sled races, underwater hockey and the underwater tricycle race. Prizes will be awarded the winners. All participants in underwater activities must be certified scuba divers. Activities will take place in



the SUNY pool, West Gym, Saturday afternoon from 2:00 to 5:00 pm.

There will also be a series of seminars

on diving and diving safety. While the games of the carnival are going on, there will be a series of films and slide presentations in the gym. Various diving and safety organizations will have display tables set up for the public. There will be no fee for this part of the program.

Proceeds from the carnival and symposium will go to the SUNY Binghamton physical education department and the E.G.M.E.A., a non-profit corporation dedicated to diving education and safety.

For more information, or a copy of the symposium program call Dave Thomas, Department of Physical Education, SUNY Binghamton, Binghamton, New York 13901; (607) 798-3962. 

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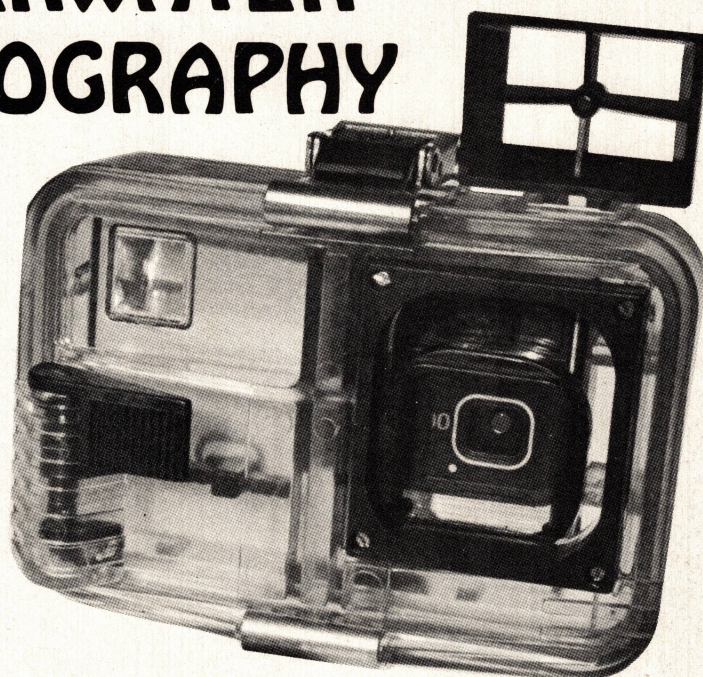
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Technifacts

BY E.R. CROSS



In the current series of this column, started last month, an attempt is being made to reconcile the difference in thinking between sport divers, commercial divers and marine archaeologists about wrecks, treasures and certain other marine sites. There are only a very few divers in the world trained in the science of marine archaeology. But there are thousands of wrecks and other marine sites dating from pre-history to the present. Even if there were 10 or 100 times more marine archaeologists, it would be totally impossible to locate, identify, study and historically reconstruct every wreck.

Only a very few wrecks are actually of historical significance. And, there are few scientific facts that can be determined about most sunken wrecks. This does not mean that a wreck or other marine site should be plundered by sport or commercial divers. The proper sequence of events, as they seem to me, is that a diver

should first establish the location and extent of the site. Sketch the site as it appears, noting particularly any objects or conditions that might help in understanding it. After this preliminary survey is completed a diver should discuss the site with archaeologists who may be able to help in determining what action should be taken. Even though most wrecks are not of historical significance, the diver must respond to his/her discovery in a responsible way. Governments, both state and federal, must also respond to a diver's report of a wreck site in a responsible and realistic way.

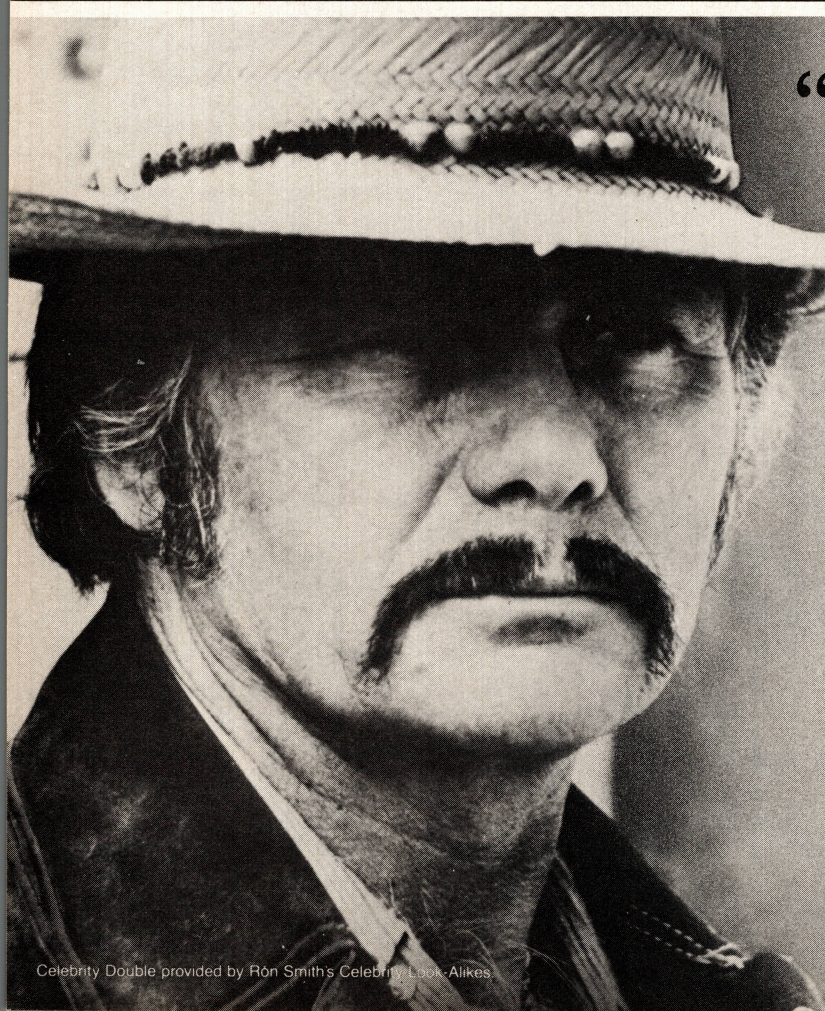
Probably the most realistic approach to marine archaeology can be found in Australia where the government has been one of the world leaders in establishing laws and policies for the protection of submerged shipwrecks. The Historic Shipwrecks Act (1976) (Commonwealth) applies to the waters surrounding but not

within most states of Australia. Some states have additional legislation covering internal (inland) waters. One such state, Victoria, has passed The Historic Shipwrecks Act 1981, that establishes protection for certain designated wrecks in state waters.

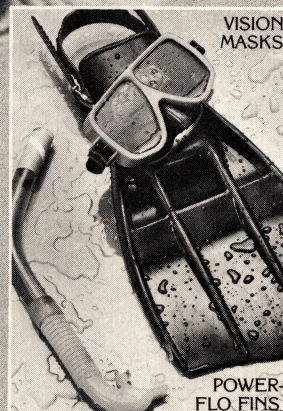
There are about 600 recorded shipwrecks in Victorian waters, and many others which pre-date settlement of that state or have not yet been discovered. Of these only seven have been declared historic under the two Historic Shipwreck Acts mentioned previously. There are two categories of protection under both acts. These are:

1.) Historic Shipwrecks

Divers have free access to historical shipwrecks but shall not damage or destroy, interfere with, dispose of or remove an historic shipwreck or a relic from such.



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TECHNIFACTS

Penalty for violation shall be a fine of \$5,000 or imprisonment for a period not to exceed five years or both. Thus divers can dive the wrecks so designated but on a "look but don't touch" basis.

2.) A Protected Zone

In certain cases a zone may be declared, of up to 100 hectares (equal to about 247 acres or an area about 3,200 feet on each side), where no access to the area is permitted except by a special permit. This protection is given to sites that are of great historical importance and at extreme risk from visiting divers, i.e., where organic materials might be unwittingly destroyed by no more activity than by the wash of a diver's fins. Artifacts can also be protected.

In Victoria a person in possession of any artifact from a shipwreck subsequently declared an historic shipwreck must notify the Maritime Archaeological Unit as soon as possible. Relics so reported *will not* be confiscated but will be recorded for possible future studies. Also, public displays of shipwreck material from private collections will be organized by the unit on a loan basis.

Notification of the discovery of a shipwreck to the Maritime Archaeological Unit is mandatory unless there are rea-

sonable grounds to believe a shipwreck has already been reported. There are cumulative penalties of \$1,000 each for not notifying the unit of a find; for attempting to conceal the location; and for making false or misleading statements.

To put more emphasis on the importance of these regulations a reward may be payable to the person who first notifies the unit of the location of a shipwreck that subsequently is declared an historic shipwreck. Also, a reward may be payable for information leading to the conviction of a person for offenses under the acts.

In Australia, officers may be appointed that have powers of search and arrest of violators of these acts. In the State of Victoria the Commonwealth and State Police (officers already in service) automatically enforce the Commonwealth act. The Victorian state act is also enforced by existing officers such as fisheries and wildlife officers and those of the ports and harbors division.

The *William Salthouse*, a two masted brig of 241 tons, sunk near Queenscliff, Victoria, is a good example of divers, marine archaeologists and government working together to preserve an historical site. The wreck was first discovered by Peter Kennedy and Dennis Bolton in August 1982. The find was reported to the Maritime Archaeological Unit and the vessel declared an historic shipwreck on December 22, 1982. Divers could still

dive the wreck but could not collect artifacts from it. Despite the possibility of heavy fines and imprisonment some divers tore up parts of the vessel for articles of value. On February 9, 1983, the site was declared a protected zone and divers are now prohibited from diving the area without a special permit.

The ship was British built in Liverpool

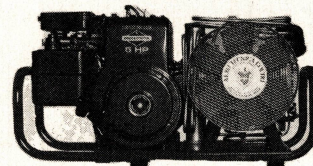
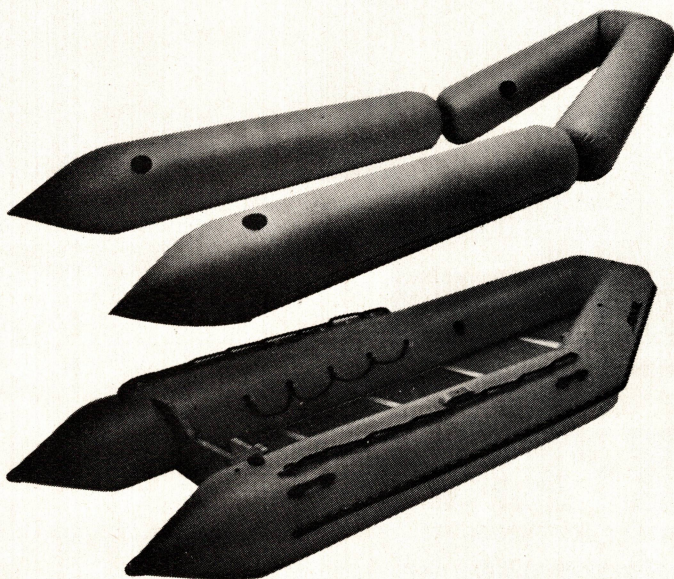


in 1824 and shipbuilding methods for this time are well documented. However, the *William Salthouse* was the first merchant vessel to travel from the British settlements of Canada directly to the newly settled Australian colony of Port Phillip Bay. She was also one of the largest vessels lost in the bay during this period. The importance of the wreck is in the cargo rather than in the vessel. The cargo consisted of barrels of flour, salt pork, salt beef, salt fish and some alcohol. Information on stowage and, in some cases, the difference between the actual cargo and the manifest is important.

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TECHNIFACTS

Much of the cargo in this wreck was shipped in barrels. The contents, weights, date of packing and merchant company are burnt into each barrel lid which gives information for historical research into the compilation of this first shipment to Australia. Such research would be carried out with historians in Canada where, in Newfoundland, a marine archaeological investigation of a wreck at Red Bay has developed considerable information on barrel stowage.

As a matter of interest Peter Fulton of Seaford, Victoria, reported that the rock which the *William Salthouse* struck has been responsible for about 30 shipwrecks and is called Corsair Rock. It is at the mouth of Port Phillip Bay. Point Nepean on the east side and Point Lonsdale on the west mark the two sides of the entrance that is only 3000 yards across. There is a maximum depth of only 48 feet over the rocky bar at the entrance and, with 800 square miles of bay area water trying to get across this bar at tidal changes, mountainous waves develop that become very dangerous to all except large vessels and can cause navigation problems with vessels of any size.

BOOKS

A Technifacts reader wrote: "I am interested in finding a few publications on marine archaeology. A list of books dealing with the tools and techniques would be a great help."

The books on this subject I have in my diving library, with a brief statement as to my thoughts on them, include:

1. *All About Undersea Exploration*; Ruth Brindze, Random House, N.Y. This is a book of general interest. This is good for beginners.

2. *Marine Archaeology*; edited by Joan du Plat Taylor for World Underwater Federation. Published by Hutchinson of London. Mostly Mediterranean sites. Scholarly. Good.

3. *Archaeology Beneath the Sea, A Personal Account*; George F. Bass; Walker and Co., N.Y. Scholarly. Good. Also mostly Mediterranean.

4. *History Under the Sea: A Manual for Underwater Exploration*; Mendel Peterson. Smithsonian Institution Press, Washington, D.C. It is instructive, scientific and advanced.

5. *Nautical Archaeology; A Handbook for Skin Divers*; Bill and John Wilkes. Stein and Day Publishers, N.Y. Similar to the four above.

Next month Technifacts will explore historical sites found by divers in the United States from Hawaii to Texas to Michigan—some good finds. Be with us. 

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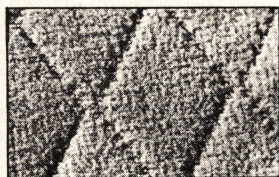
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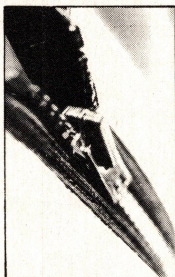
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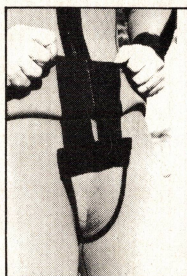
PERFORMANCE PROVEN FEATURES



Super stretch deep pile diamond nylon for easy entry, resistance to abrasion and ultraviolet damage.



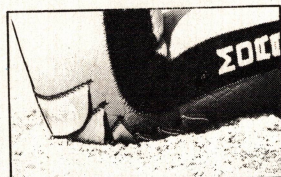
Delrin zip with corrosion free **NICKLE SILVER** slider



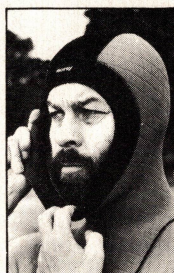
Triple velcro fastener



Double sealed fly zip optional extra

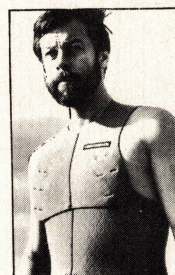
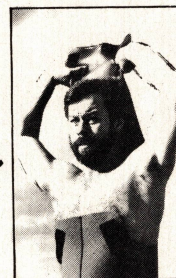


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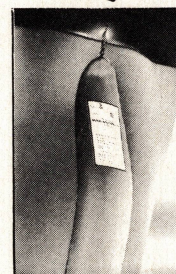


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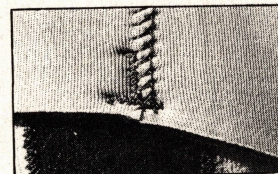
Long John top smoothskin continuous neck seal, velcro fastened



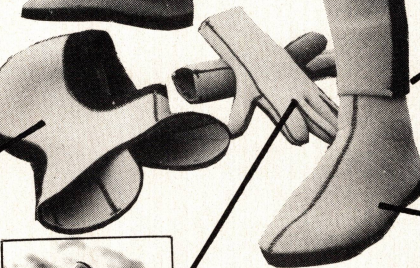
Shaped and contoured spine pad in Long John



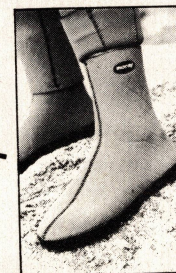
Wrist seal optional extra



Seams glued and blind stitched on shallow penetration machines, assures watertightness. Unique T bar tack locks seam ends



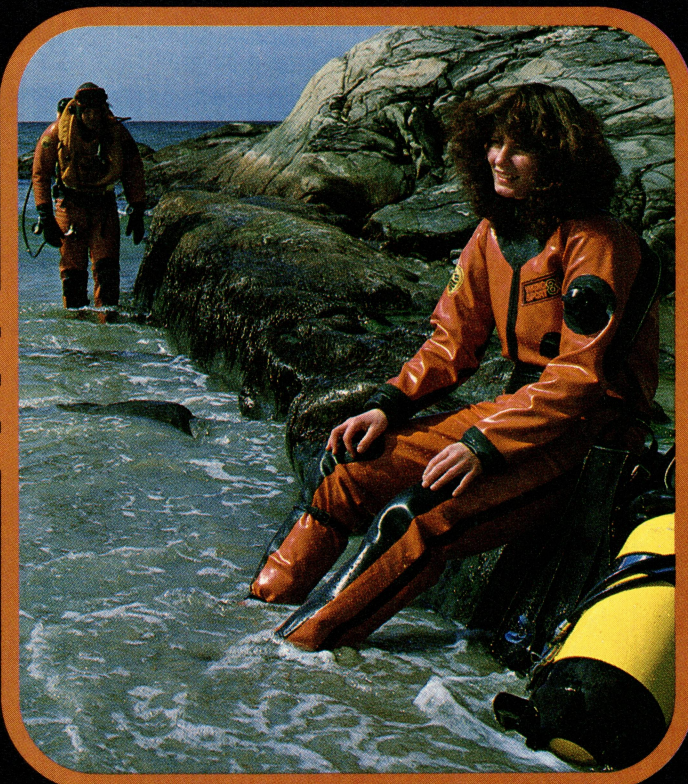
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HOBBY-PAC

(Continued from Page 30)

panic! Until the film is completely dry, the emulsion side will appear yellowish and underexposed. Drying takes up to two hours, depending on temperature and humidity, but you can dry film in 10 or 15 minutes with a hairdryer. If you use heat, don't allow temperatures over 140°F.

CUTTING AND STORAGE

Negative files, which are available at camera stores, are great for protecting your processed film. Cut the film into short strips of six frames each, and insert these strips in the files. Regular envelopes are cheaper, but the strips could rub together and scratch. Handle uncut film by the edges only. If dust particles dried on the emulsion, soak the film in stabilizer for about five minutes and then gently try to wipe the particles off with a fingertip. If you get fingerprints on the dry film, use commercial film cleaner (or lighter fluid in an emergency) and a wad of cotton to wipe them off. Fingerprints left on film can etch the emulsion. When you get home, carefully cut your best slides from the strips and mount them in plastic or cardboard slide mounts that are available at camera stores.

Kodak, Hobby-Pac, Ektachrome and Photo-Flo are registered Eastman Kodak trademarks. For more information, write to: Eastman Kodak Company, 343 State Street, Rochester, NY 14650.

AUSSIE PINEAPPLE HUNT

The Sunshine Coast Diving Centre, in Southern Queensland, Australia, recently held its Annual Pineapple Hunt off the beach at Mooloolaba. Over 250 divers competed for prizes worth over \$4,000,



donated by equipment manufacturers such as Tekna, Dacor, U.S. Divers, Sea-tec and Scubapro. First prize was a week for two at Hayman Island. The divers charged down to the beach, donned their tanks, and competed to retrieve 150 submerged pineapples.

For more information contact the Sunshine Coast Diving Centre, 538 Milton Road, Toowong, Queensland 4066, Australia; telephone (07) 370-9030.

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RESEARCH, DESIGN, ENGINEERING, QUALITY

TANNER & CORTES BANKS

Exciting So. California Dives

BY STEVE SMITH

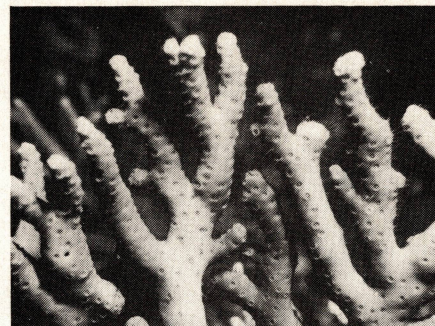
For years I'd longed to do what I was about to do, dive Cortes Bank. The sun shone brightly; a ten knot breeze sent little flecks of foam dancing across the tops of three foot swells. Splash! Tom O'Neil and I hit the water simultaneously, each holding a Farallon DPV. We planned to use these to aid us in our preliminary biological survey of the bank. According to the ship's fathometer, the water was 120 feet deep. Visibility was over 80 feet. Tom and I signaled each other and began our descent. At 40 feet, we could just begin to see the bottom, far below—and sharks, sharks as far as you could see in every direction. Hundreds of small gray torpedoes gliding toward us. We quickly powered the remaining 80 feet to the rocky bottom. Kneeling on the bottom seemed a much more logical place to be than in midwater. The sharks were small, mostly three footers, with an occasional five footer. Not really aggressive, but not shy, either, they swam over our heads and brushed our legs. A prominent dorsal spine, anterior to each dorsal fin, allowed us to identify them as the spiny dogfish, *Squalus acanthias*, a common shark found worldwide in temperate

waters and considered harmless. For the next five days, our four person dive team sighted dozens to hundreds of these graceful fish on every dive. The sharks were boldest at dawn and dusk when they would occasionally rush in and bite at our bubbles.

That was August of 1975, and the first of many biological diving surveys conducted on Cortes and Tanner Banks by the Pacific Outer Continental Shelf (OCS) Office (part of the Bureau of Land Management). These periodic surveys, still being conducted, are aimed at identifying unusual or unique areas and determining the population densities/growth rates of selected species. In addition to more than 420 dives made by the Pacific OCS staff, consultants have made hundreds more and conducted studies using a mini sub.

What did we find? Why do I call these banks Southern California's most unusual dive sites?

First, a little geography. Tanner Bank and Cortes Bank are 111 and 115 miles west of San Diego. They are the shallowest portions of the Santa Rosa-Cortes Ridge, which extends from San Miguel Island on the north past San Clemente Is-

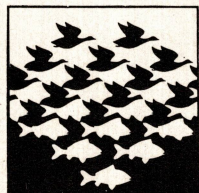


photos/Bonnie J. Cardone



land on the south. Depths between the two banks reach a maximum of 820 feet. The areal extent of the banks, at the 200 foot contour, is approximately 1,900 acres for Tanner and 7,100 acres for Cortes. Both are characterized by very rugged, high relief rocky bottoms which rise to within 65 feet of the surface at Tanner and three feet at Cortes. There is a con-

(Continued on Page 47)



Bauer Air-Pure Air



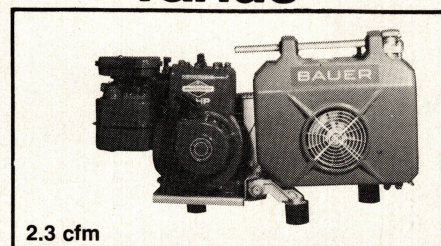
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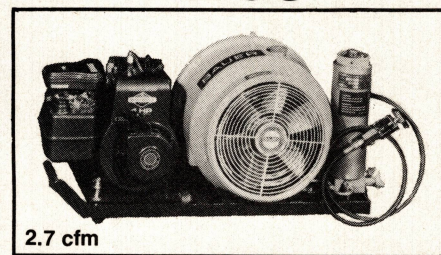
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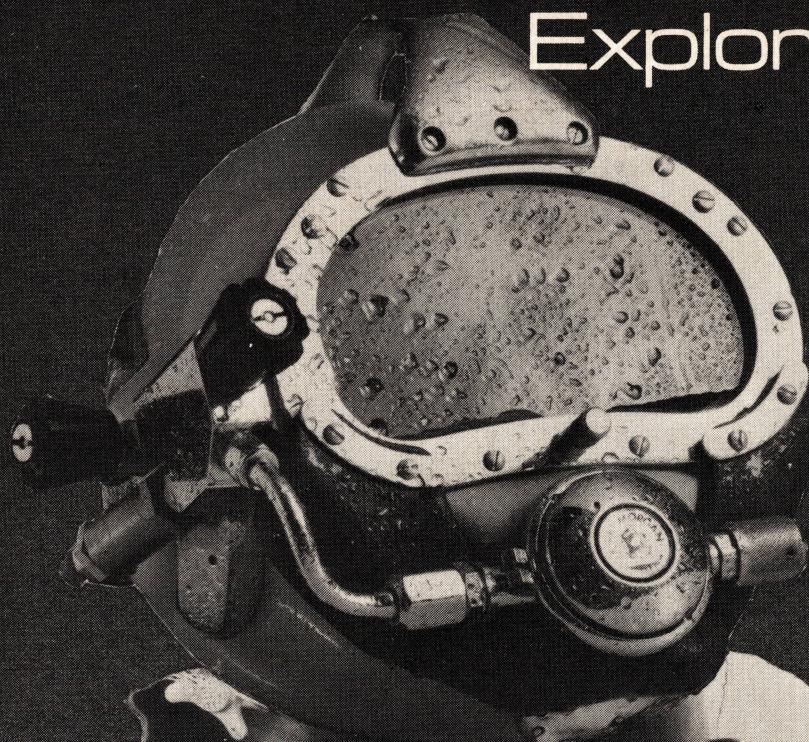


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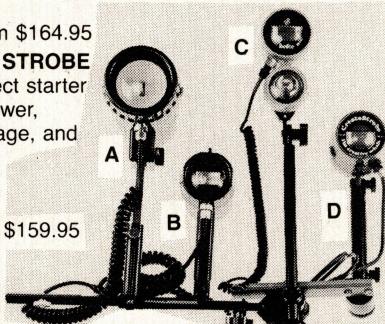
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The water was chilly and light was failing. While Sue strapped a tank over her bikini I located a brain coral near plenty of angelfish, then distanced my strobe to illuminate the scene. But would exposure from my strobe match the afternoon sunlight, or would Sue be brightly lit and the background go black?

Planning did the trick. I knew that the sun was getting low, so I selected a strobe that was not too strong for the dim light. One that was bright enough to light Sue and the angel, yet not overpower the water behind.

New Nikonos V is on the way. Quantities are limited. Place your order now. Call for information.

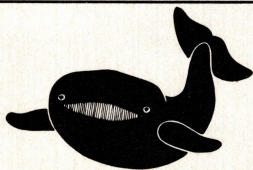
How We Did It. After metering the sunlight I distanced my strobe from the subject so that light from sun and strobe matched and blended over Sue's face and shoulders. Then as gray angels played over the coral I shot 36.

It all paid off. Ten minutes after we entered the water, I felt I had the shots I wanted. Later, in the darkroom, I knew it. Even in black and white, details in this photo are clear and highlights and shadows where they belong. It was easy, because we chose the right strobe for the lighting conditions.

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TANNER & CORTES

(Continued from Page 44)

siderable area of Cortes that is less than 40 feet deep.

Because these banks are the two furthest shoal areas off Southern California, they are regularly subject to very high waves and swells. Twenty foot seas are common and two knot bottom surges have been recorded at 200 feet. Even on calm days, strong surface currents are



typical. The strong currents and frequent high waves sweep virtually all the sediment off the shallow portions of the banks. These factors, combined with pollution free ocean water, result in excellent visibility; 100 feet is common and 150 is not unusual. Such clear water makes the banks different from the majority of Southern California dive sites. But the real excitement comes from the underwater topography and spectacularly rich and diverse marine life associated with it. Large segments of Tanner and Cortes are composed of rocky spurs rising up to 40 feet off the bottom and interspersed by narrow, interconnecting gullies. Clouds of blue rockfish flit back and forth over the ridges, while groups of tasty ocean whitefish, averaging a foot and a half long, mill about like cattle. Sheephead are so numerous they actually become a nuisance. Divers frequently have to punch them out of the way to get their work done. The sheephead often have the last laugh, though, by swimming up to divers from behind and biting them. We experienced a number of such "attacks." Add to this giant sea bass, fat bocaccio rockfish (salmon grouper) too numerous to count, giant schools of jack mackerel, ocean sunfish, blue sharks and California sea lions (on nearly every dive) and you have an action packed area. Killer whales and (tentatively) a white shark have also been sighted. The fact that large numbers of California sea lions

swim at least 50 miles from the closest land (San Clemente Island) to feed on Tanner and Cortes is an indication of how "fishy" these banks are.

Many species, common at other Southern California dive sites, are rare or missing from the banks. This list includes garibaldi, calico bass and the giant kelp, *Macrocystis*. The lack of these organisms is more than compensated by other forms of marine life. One species of particular interest to divers is the hydrocoral, *Allopora californica*, variously referred to as purple coral, red coral and blue coral. *Allopora* comes in all these colors, plus pink and orange. The blue-purple phase

is the most common within this species' range (Farallon Islands off San Francisco to North Central Baja California). On Tanner and Cortes Banks, however, nearly all the specimens are pink or red. They occur most abundantly between 80 and 130 feet, although these corals have been sighted deeper than 300 feet and, off San Clemente Island, as shallow as three feet.

Giant kelp, *Macrocystis sp.*, so abundant around the Channel Islands, is extremely rare on the banks, probably due to the strong wave surge. It is replaced by the southern sea palm, *Eisenia sp.* Around Anacapa Island, dense beds of the sea palm are restricted to waters less than 25 feet deep. On the banks they occur to over 125 feet! Even though the sea palm doesn't have to compete with giant kelp on the banks, this five-fold increase in depth range shows what magnificent water quality the sport diver can experience on Tanner or Cortes.

Conditions are generally best between July and the first part of October. Late December and early January are often excellent, too. Currents and surface waves are usually milder before noon, so an early arrival or multiday trips are advised. The unique nature of Tanner and Cortes Banks—excellent water clarity, rich and unusual marine life, isolation from pollution and sport diving pressures—make them an exciting destination for even the most experienced divers. 🐠

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RONRICO GOLD RUM

YMCA DIVE REFRESHED

The First Annual Dive Refreshed Campaign is scheduled for the month of May. All certified divers are invited to call their local YMCA to inquire about the free, one day refresher course.

In order to ensure both the safety and enjoyment of your next underwater adventure, the Dive Refreshed Campaign is for: 1) Those with less than four open water dives in the past year; 2) Those with no open water dives in past six months; 3) Those planning dives in an environment which is new to them.

WYOMING U/W TREES

Members of the Jackson Hole (Wyoming) Dive Club recently discovered two large trees submerged in Jenny Lake in Grand Teton National Park. Both trees are upright, with their roots firmly embedded in the lake bottom. How the trees got to be in such a position is still uncertain and will not be fully understood until carbon dating has been performed on samples sent to U.S. government officials.

Various theories have been advanced to explain the trees, but the most interesting, yet unproven, is that they were submerged during a massive movement along the Teton Fault. If this is true the discovery of the trees might have impor-

tant implications on the future of the Jackson Lake Dam, in the park.

For further information contact Teton Aquatic Supplies, P.O. Box 3482, Jackson, Wyoming 83001.

HMS THUNDERER

Marine Archaeological Research, Ltd., has tentatively identified a shipwreck it recently discovered off the coast of Haiti as the HMS *Thunderer*. The *Thunderer* was a 150 foot British man-of-war lost in 1780 during a hurricane. If the wreck proves to be the *Thunderer* it might be carrying booty which was being transported back to England when the hurricane struck.

The wreck site was discovered by MAR's vessel, RV *Beacon*, after a week-long search of open ocean. So far the *Beacon* crew has retrieved cannons, cannon balls, parts of ship's rigging, ballast rocks, pottery shards and two massive anchors.

MAR plans further investigation of the site, and is in the process of establishing a Museum of Marine Archaeology of Grand Cayman where historical exhibits and artifacts will relate the maritime history of the West Indies.

VIDEO GUIDE

A videotape designed to aid dive shops and clubs interested in sponsoring underwater film shows is available on a free-loan basis from Marine Graphics. The tape features interviews with successful

meeting planners, film show producers and underwater filmmaker Bill Lovin. Problems of publicity, projection equipment, auditoriums and dealing with film producers are discussed.

The 30 minute tape, available in VHS format, may be obtained from Marine Graphics in Chapel Hill, NC.

SCUBA EXCHANGE IN MANHATTAN

The Scuba Exchange has opened a new dive store in Manhattan, NY. The store will carry a full line of diving equipment and provide a full range of services including instruction and rentals. The store also plans to introduce a shuttle service which will transport divers to area boats via a 16 passenger van.

The new facility is at 135 E. 34th Street (off Lexington Avenue) and the new telephone number is (212) 532-8858.

SOLUS ACQUISITION

Oceaneering International, Inc., recently acquired Solus Ocean Systems, Inc. According to Jim Joiner, president of the College of Oceaneering, "Oceaneering International's 1,800 employees combined with Solus' 1,100 topside and diving personnel will create many new employment opportunities for our graduates. The rapid growth of Oceaneering International, plus the advent of our new Atmospheric Diving Suit Training Course means we will admit more students."

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MARES Snub Nose

Got'cha gas gun
for reef fish

TEXT AND PHOTOGRAPHY
BY FRED FISCHER

The Mares Snub Nose has to be one of the smallest spearguns ever made and most certainly the shortest of the Mares pneumatics. Unloaded, it measures only 16 inches and fits neatly into a holster. In a world where size and performance are almost directly related, the Snub Nose appears to be at a disadvantage. It is not the gun of choice for serious spearfishing. However, it is ideal for taking small reef fish at close range. If you must travel light, it fits in the corner of your gear bag. If your dive plan does not include spearfishing, but you have an inner compulsion to be prepared for a rare encounter with a tasty halibut, the Snub Nose could be as close as its holster.

Close inspection of the Snub Nose reveals that the design is similar to the six other Mares pneumatic spearguns. The black anodized aluminum barrel is simply shorter. The force required to insert the 14 inch shaft is small enough so that only one power setting is required. A stainless steel twin barbed rock point tip with seven millimeter threads is included. The eight foot braided nylon shock cord is provided with an elastic link to maintain tension on the line when the gun is loaded. Five wraps are required between the muzzle and mechanical line release lo-

cated under the trigger. The grip and trigger housing are molded from an extremely tough nylon polymer. Right or left handers will find the grip comfortable and easy to manipulate. The safety is above the trigger and is actuated by pushing it from side-to-side. Unfortunately, the position of the safety is marked only by a color code: Black is safe and red is fire. Sighting tabs are on top of the muzzle and grip.

The Snub Nose is shipped with 25 atmospheres of pressure behind the air spring. This can be varied from 15 to 30 atmospheres. I would recommend you raise the pressure to the maximum. This will help to compensate for the small size of the gun.

The new, improved hand loader is metal-reinforced for longer wear. Loading the shaft requires less effort than the longer pneumatic guns, permitting more shots with less fatigue. The best way to unload the Snub Nose is to fire it underwater. Out of water you must press the tip against a rigid surface, and while gripping the gun firmly, pull the trigger.

I was able to test the Snub Nose while diving near La Jolla, California. I stuffed the unloaded gun into the holster and clipped the shaft next to it. The length of the holster straps indicated that they

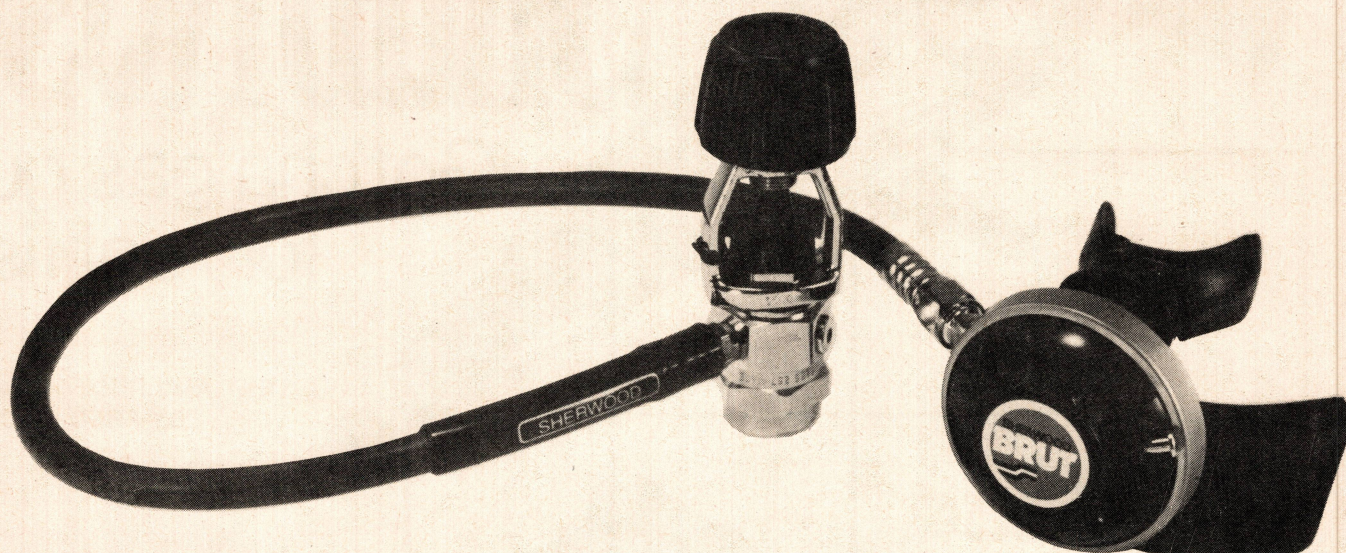
should be fastened around the thigh. However, without additional fasteners, I found it difficult to keep the assembly from sliding down to my ankle. The best storage place for the gun was in my goodie bag. I loaded and fired the gun several times to test whether or not five wraps of the shock cord could lead to a tangled line. No problems resulted. In testing the range of the Snub Nose I found that the shaft followed a straight path for four to five feet before it began to deviate downward. Dragging the gun over the rocks did not cause any prefires with either the safety on or off. As I worked my way under several narrow ledges, the virtues of this shorty became apparent. It was ideal for taking perch and kelp bass found in these areas.

The Mares Snub Nose comes with a two year warranty against defects in manufacturing. It should be rinsed in fresh water after use and stored nose down to keep oil on the main O-ring. Every two years it should be returned for factory service at a cost of only \$18.

I definitely recommend this gun for taking small fish at close range. It is nice to have along "just in case." The Snub Nose is available from SeaQuest dealers for approximately \$130.

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SHERWOOD SELPAC BRUT

TEXT AND PHOTOGRAPHY BY GEORGE COZENS

Sherwood Selpac has been in the business of making precision valves and regulators for over 60 years. Started in 1923, the company known as Sherwood Valve supplied gas control equipment to industrial, medical and research institutions. In the early '50s, Sherwood got into the field of diving by buying a company which produced a piston operated scuba regulator. Since that time the company has been making valve and regulator components and assemblies which have been marketed under a variety of well known trade names. In 1963 Sherwood acquired Selwyn Pacific, a producer of liquified petroleum gas equipment and the company name was changed to Sherwood Selpac. Six years later Sherwood became a part of Hill Acme, a manufacturer of large machine tools; tools which are used in the production of valve and regulator parts.

In 1974, Sherwood Selpac began marketing a line of scuba equipment under its own name, while continuing to supply components and assemblies to other scuba equipment manufacturers and distributors. The popular Sherwood Magnum and Magnum Blizzard regulators were introduced in 1980 and the Brut made its debut last fall.

The Brut regulator (Catalog no. SRB 2100) was intended to be Sherwood's "economy" model. In terms of cost, it certainly is inexpensive: The suggested

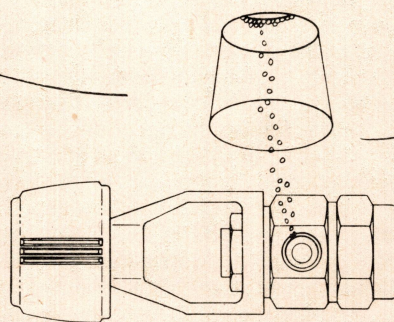
retail price is only \$150. But the word economy has connotations of cheap and inferior: These it is not! The materials and construction in the Brut are the same high quality as those found in Sherwood's top-of-the-line Magnum models. If costs were trimmed, it must have been in the elimination of a few features which might only be needed in extreme diving situations.

In outward appearance the Brut looks very much like the Magnum, the only obvious difference being the purge button decal on the second stage. Indeed, the Brut has incorporated many of the Magnum features. Internally, however, there are a number differences.

The first stage of the Brut is a piston operated design, housed in a compact,

brass body with a triple chrome plating: copper first, nickel second, then chrome. This stage offers: one marked high pressure port; three low pressure ports; and a swivel yoke rated at 3500 psi. It supplies intermediate pressure in the range of 135 to 150 psi. A 3000 psi rated DIN adapter is also available. Technically, the design is not balanced to totally compensate for changes in tank pressure. However, in my evaluation dives, described later, the Brut performed as if it were balanced. The greatest depth I could reach at the location was about 55 feet. At this depth, and with tank pressure ranging from 2000 to about 1000 psi, the Brut supplied all the air I could inhale and with less resistance than the good perform-

The function of the first stage of the Sherwood Brut regulator can be checked easily. With the stage pressurized and submerged, a small stream of bubbles should be seen escaping from the one way check valve. The amount of air escaping should equal 13-17 cc per minute and can be checked by capturing the air in an inverted shot glass. It should take two minutes to fill the shot glass with air.



ance comparison regulator. (Both regulators were attached to the same tank with a Y valve, which Sherwood makes.) Toward the end of the dive, in shallow water, I just about exhausted the tank in an effort to determine the Brut's performance at low supply pressures: There was

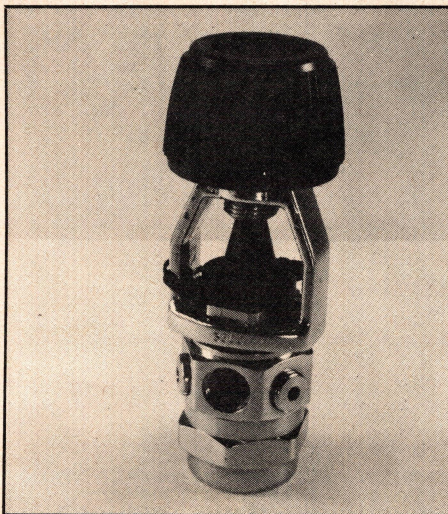
rate. This air fills the chamber to a pressure close to that of ambient, then bleeds off the excess to the outside via a one-way valve in the body. With this patented design, called the Dry Air-Bleed System, the first stage is sealed against water and contaminant intrusion, while only about

and the demand valve open during storage, so the valve seat does not deform. The demand valve body is triple chrome plated brass and the seat is neoprene. Another patented design feature is the stainless steel, variable fulcrum demand lever. This serves the same purpose as any conventional demand lever—it translates movement of the diaphragm into opening and closing of the demand valve. But Sherwood's clever lever has a curved shape, designed to give it greater mechanical advantage when the valve starts to open, therefore, reducing the initial (cracking) effort and then decreasing this mechanical advantage as the valve opens further, in order to control the increasing venturi effect.

Routine maintenance of the Sherwood Brut should be minimal: rinse in fresh water after use and dry out of direct sunlight. As with any good regulator, annual service by a professional service center is highly recommended. The limited lifetime warranty to the original purchaser covers *all* replacement parts, including the rubber components, except for instances of abuse, loss, unauthorized repair, etc. Service charges for labor, therefore, should run no more than \$10 to \$20.

During my evaluation dives, the Brut performed very impressively. As mentioned earlier, the deepest I could descend in the area was about 55 feet. Although I tried, I couldn't out-breathe the Brut. I feel confident that the same would be true at 100 feet. Over the full range of inhalation, from sipping to gross inspiration, the Brut's resistance was as easy, and in most cases was noticeably easier, than my comparison regulator. In all the usual, contorted orientations tried, including facing down, facing up, upside down, etc., the Brut revealed no idiosyncrasies or unusual behavior. And, in all these positions there was no water leakage. With the longish exhaust tee, practically all of the exhaled bubbles ascended to the sides of the field of view. Also, freeflowing was not abnormal: With the stage filled with air and the mouthpiece pointed up, the unit freeflowed somewhat enthusiastically, but stopped when the mouthpiece was pointed horizontally or down. No freeflowing occurred with a flooded second stage, even when the mouthpiece was pointed upward.

Considering the very fine performance I experienced on my dives with the Brut, its very reasonable price, excellent warranty and maintenance-reducing materials and design features, I would highly recommend the Sherwood Brut for practically any sport diving activity. And, I think it would be ideally suited for instructional and rental programs. 



The Brut first stage (left) has one high and three low pressure ports and a swivel yoke. The second stage (below) has a Lexan case, neoprene mouthpiece and PVC exhaust tee.

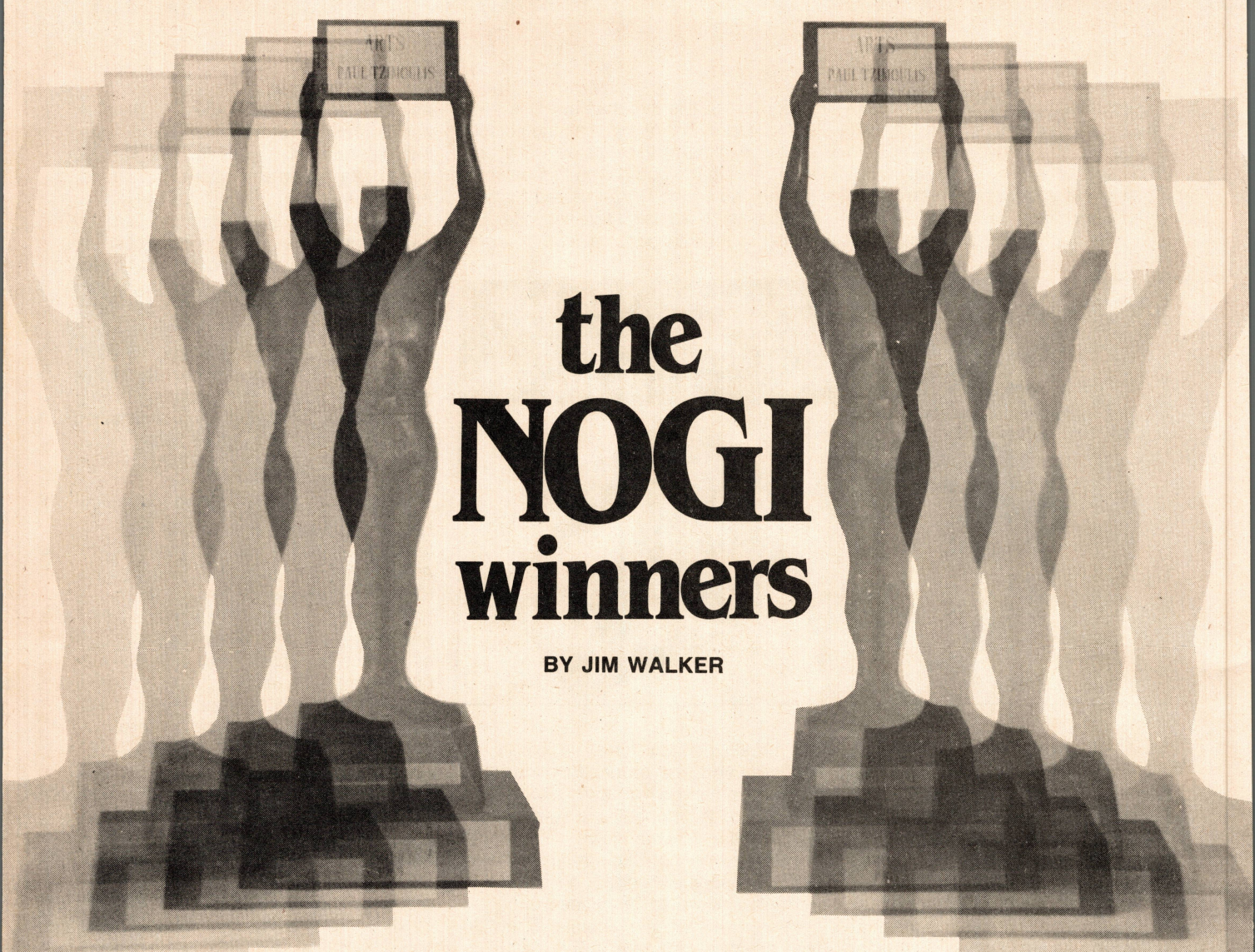


no significant change in inhalation effort.

An inherent feature of the Brut first stage is environmental protection. Sherwood accomplished this by modifying a conventional piston design. Here, supply air enters the first stage through the inlet, passes through the sintered filter and down a short tube, the end of which forms the orifice of the high pressure valve. Closing against this opening is the Teflon HP valve seat. This seat is attached to the end of the piston's stem. When the piston moves back, the valve opens, allowing air to enter the intermediate pressure chamber and go directly to any of the low pressure ports. A small amount of this air can also pass through little holes in the side of the piston's stem, flow down the length of the hollow stem, where it can apply pressure to the top of the piston, in an effort to close the valve. Between the intermediate pressure chamber and the piston's top is another chamber, often called the ambient pressure chamber, since its purpose is to sense ambient pressure. Also within this chamber is the stainless steel spring used to set the intermediate pressure level. In most conventional piston designs the ambient pressure chamber is open to water and the contaminants water might carry with it. Some manufacturers fill this chamber with silicone oil or grease in order to keep water out. Sherwood takes a different approach. In the Brut, the face of the piston has a restricted opening which allows air to bleed through at a very slow

one breath per tank of air is lost in the process. And, the proper functioning of the system can be monitored: As long as a slight trickle of bubbles is seen escaping from the one-way valve in the body, the unit is working. Should the restricted opening become clogged, no change in performance would be noticed upon ascent, but descending another 20 to 30 feet deeper would probably result in somewhat greater inhalation resistance.

The Brut's second stage is similar to that found on the Magnum, except for one or two features. The design is a downstream demand valve. The case consists of front and rear components, which screw together and are secured with a stainless steel clip. Molded of Lexan®, the case interior is contoured to give a venturi effect at higher air flows, thus reducing inhalation effort. Although the Brut's second stage is not specifically environmentally protected, the Lexan case does provide some insulation from cold water. Silicone rubber is used in the diaphragm and exhaust valve, for increased resistance to ozone and chlorine deterioration. The mouthpiece is molded neoprene and the large, wraparound exhaust tee is of flexible PVC plastic. Centered in the front of the second stage is the large, one and one-half inch diameter, ABS plastic purge button, which is flush mounted and very easily accessible. This purge button has its own integral spring lock; a sliding pin arrangement that can be used to keep the purge depressed



the NOGI winners

BY JIM WALKER

Each year since 1960 the Underwater Society of America has awarded NOGIs to four individuals in the underwater community who have exemplified themselves as leaders in the arts, science, sports/education or distinguished service. The nominations for the awards come from past winners and this peer recognition lends the NOGI a high degree of prestige. The most recent winners are Genaro Hurtado, Dr. Richard Cooper, Lloyd Bridges and Dick Bonin.

Dr. Richard A. Cooper/Science Dick Cooper received his Ph.D. in marine biology from the Graduate School of Oceanography, University of Rhode Island, in 1963. For more than 20 years he has conducted and directed a broad range of research activities from migration and growth studies of inshore commercial fishes, lobsters and crabs to defining the biology and geology of submarine canyons to monitoring site-specific locations on the sea floor for assessing the impact of oil and gas drilling on marine life.

Cooper has received extensive training with the U.S. Navy and other organizations in all types of diving, including: scuba (air and mixed gas); surface supplied air; diving bell (air and mixed gas); saturation diving; and submarine lockout. His diving credits include being team leader with the Tektite II program, Sea Lab III, Helgoland-International Program in the North Sea, Project FISHH in the Gulf of Maine and Deep Diver Saturation in the Gulf of Maine. He has logged over 2,200 hours of scuba time and 1,800 hours of saturation time.

Since 1971 Cooper's research activities have relied heavily on research submersibles, with more than 700 hours of bottom time in these vehicles to depths of 10,000 feet.

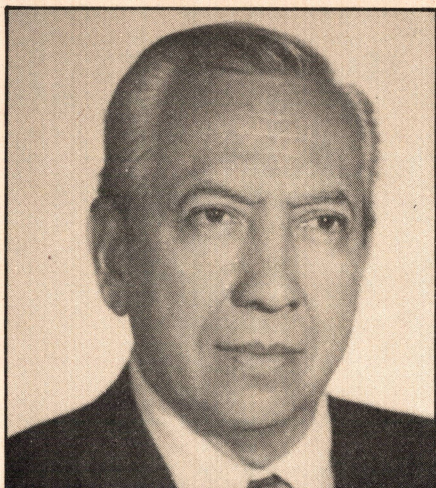
Cooper is currently the director of the National Marine Fisheries Service Manned Undersea Research and Technology Program. He has authored 36 major publications and many smaller articles, including chapters in textbooks on

the biology and ecology of lobsters and the biology and geology of submarine canyons of the Northwest Atlantic.

Cooper is certified as a U.S. Navy Man-In-The-Sea Aquanaut, U.S. Navy Deep Sea Diving Officer (air and heliox) and a NOAA Aquanaut. His list of awards include: Hudson River Association (Conservation), U.S. Department of Interior (Publication), *Who's Who in America*, American Littoral Society (Dedicated Service) and American Motors (Conservationist of the Year).

Genaro Hurtado/Arts A pioneer diver in Mexico since 1952, Genaro Hurtado is a founding member of the CEDAM (Conservation Education Diving Archaeology Museums) branch in that country and is an internationally recognized filmmaker and underwater archaeologist.

Cameraman for 1,800 films and newsreels, including 55 feature films in Mexico and 34 in the U.S., Hurtado's credits include: *Cabo Blanco* with Charles Bronson, *Le Magnific* with Jean Paul Belmon-



Cameraman Genaro Hurtado has filmed archaeological expeditions.



Dr. Cooper directs a program for the National Marine Fisheries Service.

do, *Caveman* with Ringo Starr, three Disney films and 25 Tarzan films. He has authored 16 shooting scripts for movies and designs his own housings for underwater use. He developed the technique of color decoposition for U/W use as well.

Hurtado's awards include a Gold Medal for best film, Berlin and Madrid; Critic Award of Cannes, 1980; and the Ariel (Mexican Oscar) for Best Cameraman of the Year. He has also won the Biennial of Venice, Cannes, France; Best of Show at the XI International Film Festival, Santa Monica, CA; Best of Show in 1968 by the Academy of Underwater Photographers, U.S.A.; and Gold Medal 8th Exhibition, Underwater Photographic Society, U.S.A.

Actively participating in CEDAM and CEDAM International expeditions since 1958, Hurtado has explored many famous archaeological sites in the Mexican Caribbean. He dived on and filmed the *Matancero* wreck, and the sacred well of Chichen Itza with the National Geographic Society, Ford Motor Company and

CEDAM International. He has explored many other such wells and caves in the Yucatan area.

With various high altitude dives, including a mountain lake at 14,800 feet, Hurtado developed a decompression table for high altitude diving.

Dick Bonin/Distinguished Service

For many years a central figure in the development of scuba gear, Dick Bonin is the president and general manager of Scubapro, a company he helped create.

Bonin's career in diving began in the early '50s as diving officer, submersible operations officer and test and evaluation officer for the U.S. Navy's Underwater Demolition Team 22. Later in that decade he was a YMCA scuba instructor and manager of a dive store in Chicago, IL. During this period he co-founded the Illinois Council of Skin and Scuba Divers; founded the West Suburban Fathom Masters dive club; helped introduce underwater hockey in Chicago; and wrote the first diving log for sport divers.

Bonin's next step, during 1958-60, was to become general manager of Swimaster in Los Angeles, CA. He helped develop the Swimaster line, including many products that are still popular today. At this time he was a founding member of the Diving Equipment Manufacturers Association. He has been president of DEMA and is a member of its board of directors to date.

In the early '60s Bonin became vice-president of Sportways and helped develop that company's line, including the first proven submersible pressure gauge and single hose regulator.

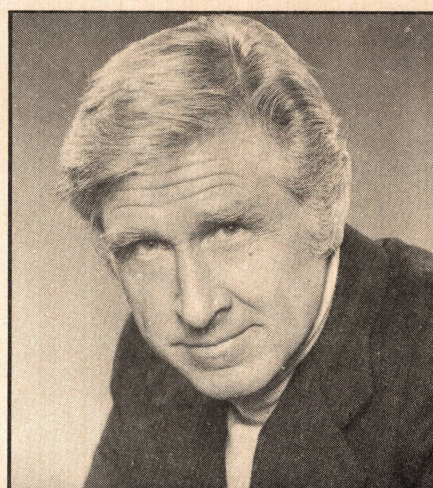
Co-founding Scubapro in 1963, Bonin helped introduce the innovative line offered by the company, including many safety improvements for divers. Scubapro has grown into one of the largest manufacturers of diving equipment in the world and has eight overseas branches.

Bonin remains an avid diver and spearfisherman and is head of the Scubapro Dive Test Team. He conducts dive seminars throughout the world.

Lloyd Bridges/Sports/Education

In his famous role as Mike Nelson on the early television series *Sea Hunt* (1957-1961) Lloyd Bridges has probably done more to promote scuba diving and inspire potential divers than any other person. In an era when diving was considered a sport for daredevils only, there was Bridges (Nelson) appearing weekly on television sets in millions of homes. While sport diving has evolved considerably since those early days, *Sea Hunt* did much to educate the public and dispel myths and misconceptions about the dangers of the deep.

Of course, Bridges' acting roles are not limited to diving scenes. His numerous television appearances include: *Tragedy in Temporary Town*; *The Fortress*; *The People Next Door*; *Silent Night, Lonely Night*; *The Great Wallendas*; *The Critical*



Lloyd Bridges has helped promote scuba diving and educate the public.



Dick Bonin is now the president and the general manager of Scubapro.

List; *Roots*; *Moviola*; *The Blue and the Gray*; *East of Eden*; *The Lloyd Bridges Show*; *The Loner*; *San Francisco International Airport*; and *Joe Forrester*.

His feature films have included *Airplane*, *Airplane II*, *Bear Island*, *High Noon*, *Home of the Brave*, *A Walk in the Sun*, *The Sound of Fury*, *The Rainmaker* and *The Goddess*.

Bridges has appeared in summer theater circuits as well as major Broadway productions. Some of these include *O'Men*, *O'Women*; *Cactus Flower*; *Man of La Mancha*; *Anniversary Waltz*; and *Guys and Dolls*.

Lloyd Bridges is recognized around the world as an accomplished dramatic actor, aside from diving. But, to those of us who used to sit glued to the TV set every week watching *Sea Hunt*, he'll always be Mike Nelson. 🐠

Inquiries about the NOGI awards should be addressed to: NOGI USA, 4545 Holmes, Kansas City, MO 64100.



Lightweight Series Bridges the Dinghy- Sportboat Gap

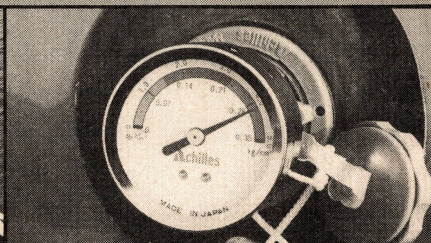
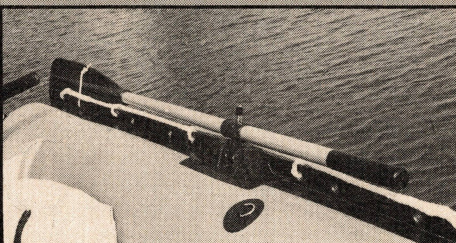
TEXT AND PHOTOGRAPHY
BY ERIC HANAUER

THE INFLATABLES



The Achilles SE 12

The SE 12 has lots of standard features including four air chambers plus an inflatable keel, aluminum oars, extra large valves, and a bracket and strap for the fuel tank. A pressure gauge is an optional accessory. The lightweight boat can handle four passengers or two divers.



I am often asked, "Which is the best inflatable boat you have tested?" The question is impossible to answer. There are a lot of boats out there, in many different sizes and configurations, for many different purposes. The ideal boat for one person's applications could be totally useless for someone else. A case in point is the Achilles SE 12. It might be ignored by some observers as too short and too light. But the SE 12 is a dive boat for a specific purpose and therefore worthy of our attention.

Achilles' lightweight SE series bridges the gap between dinghies and full fledged sportboats. It consists of two models, the SE 11, 10 feet 8 inches long, and the 12 foot SE 12. They boast virtually every feature of Achilles' regular sportboats except heavy material. Instead of

the standard 840 denier base fabric, the SE's tubes are made of lighter 420 denier nylon. (The bottom, however, is made of the same grade material as the larger boats.) The result is a lighter, more portable vessel which makes some tradeoffs in carrying capacity and horsepower. It could be an excellent tender for a yacht or cabin cruiser. The sailor who dives can use the SE 12 to reach nearby areas without moving the larger boat. It can also be the ticket to diving adventure for someone with a compact car. It is easily carried and launched by two persons.

Our test boat was an attractive package, decked out in royal blue, a new color for Achilles this year. (All their sportboats are also available in red or gray.) It doesn't look like a cheap model. The new two piece aluminum oars, fiberglass

covered transom, removable bowdodger and helmsman's grab handle are all standard features. Scott McIntosh of Porta-Marine, Costa Mesa, California outfitted the boat with a Suzuki 15 horsepower engine. We loaded it with three people and a set of diving gear. With the open front end, we could have added a fourth passenger, but it would have been cozy. This one is definitely a two diver boat. When Scott gunned the engine, the SE 12 hesitated just a bit, then went up on a plane. Handling was just what one would expect of a small, light boat with an inflatable keel. It bounces over chop and skids a bit on turns. Because of its size and tube diameter, I wouldn't want to run it in big swells or heavy wind chop. But for short trips of up to a mile or two in calm seas, it will do the job.



The Japanese display minimal interest in inflatable boats, so America is Achilles' primary market. Therefore the line is specifically designed for our needs. Among over 30 different models are liferafts, riverboats, two series of dinghies, three series of sportboats and workboats.

Achilles has made a sizeable dent in United States inflatable boat sales over the past few years. Unlike many manufacturers which are subdivisions of tire companies, the parent firm is one of the world's largest producers of sheet plastic. In an era when many competitors are using plastic materials to some degree, its boats are made entirely of the traditional nylon/Hypalon/neoprene combination. The shiny finish of the material, which has become an Achilles trademark, is a result of the slow curing pro-

cess used in its manufacture. The effect is more than just cosmetic. Subjecting the material to high pressure and temperature for a longer time results in a smoother, stronger fabric. Inside, where the ultraviolet resistant properties of Hypalon are unnecessary, the coating is pure neoprene for additional strength. Fabric panels are glued together to form the boat, with seam taping both inside and out. Then the entire hull is cured under controlled heat to ensure an even and thorough bond regardless of outside temperature and humidity fluctuations. This kind of high tech workmanship in an industry geared toward hand labor is possible because of Achilles' new facility, built specifically for the manufacture of inflatable boats.

The SE 12 was extensively redesigned last year to provide more buoyancy and better handling. The hull configuration was changed and tube diameters were increased from 13.8 to 15.5 inches. For 1984, the transom is coated with fiberglass for durability. However, fiberglass covered floorboards, which are available on the heavier sportboats, cannot be purchased for the SE series. They would compromise the lightweight aspect which is this boat's reason for being. The SE's boards feature aluminum lips where they interlock, but even the stringers are made of wood. They will probably be high maintenance items.

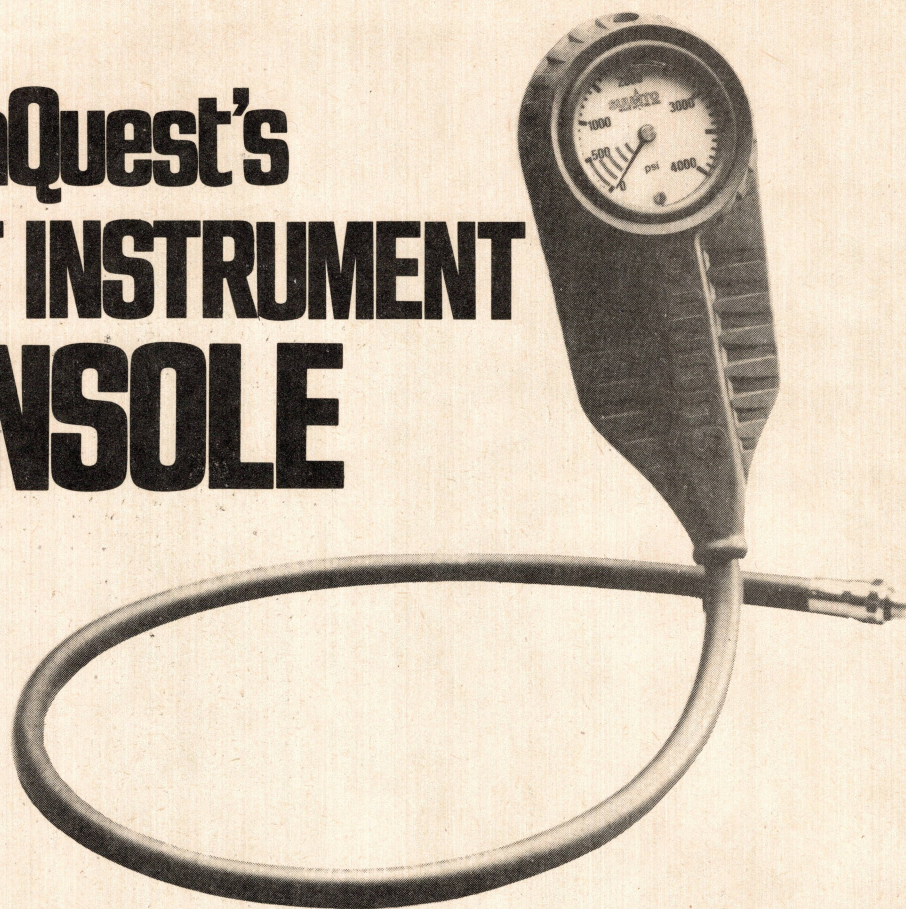
For a low priced, lightweight boat, the SE 12 has lots of standard features. In keeping with Achilles' philosophy of added rigidity and safety, it has four air chambers plus an inflatable keel. Most boats its size have only three. The new aluminum oars make sense. They break into two parts for storage and firmly lock in place. Extra large valves are installed for quicker inflation and deflation. The entire valve body unscrews for rapid dumping of air. A bracket and strap for the fuel tank is a welcome addition, as are interior bow rings provided to secure equipment. A self bailing bilge drain with non-return valve, foot pump, carrying bags, a repair kit and bowdodger round out an impressive equipment list. In a boat so completely outfitted, it is surprising that a pressure gauge is an optional accessory. About the only other option needed to go diving is a carpet to protect the floorboards. That's not available from the factory, but can easily be cut by the owner from a piece of indoor-outdoor carpeting.

The SE 12 weighs only 115 pounds. It fits into the lightweight sportboat category, to be used primarily as a runabout, with occasional diving application. It isn't a hardcore, heavy duty dive boat. But for those seeking its unique combination of portability, utility and price, the SE 12 could be a logical choice. It costs \$1,325 at your Achilles dealer. For more information write Achilles Inflatable Craft, 1407 80th Street SW, Everett, WA 98204. 

ACHILLES SE 12

Length	12'
Beam	5' 1"
Tube diameter	15.5"
Weight	115 lbs.
Payload	1100 lbs.
Capacity	4 or 2 divers
Number of chambers	4 plus keel
Material	nylon/neoprene/Hypalon
Floorboards	wood
Recommended horsepower	15
Maximum horsepower	25
Colors	gray, red or blue
Price	\$1,325

SeaQuest's COMPACT INSTRUMENT CONSOLE



BY JIM WALKER

Suunto Oy of Finland has been producing quality compasses for divers for over 30 years. Recently, this company purchased SeaQuest of Carlsbad, CA. Now, its compasses and other dive instruments are distributed in the U.S. through SeaQuest. These are available separately or in the combination featured here, the Suunto Instrument Console.

The console combines one of two types of depth gauge with a submersible pressure gauge and a compass. Suunto has arranged the instruments in a slightly different manner than many manufacturers. The depth gauge and compass are on the front side and the SPG is on the back. This puts the instruments used for navigation together for convenience. Also, because the console is only two gauges long, it can be more compact.

The console itself is a thick EDPM rubber boot which cushions and protects the instruments recessed into it. It is resistant to ultraviolet light, seawater and chemicals and is easy to grip with gloved hands. It has an extended sleeve to protect the SPG hose connection.

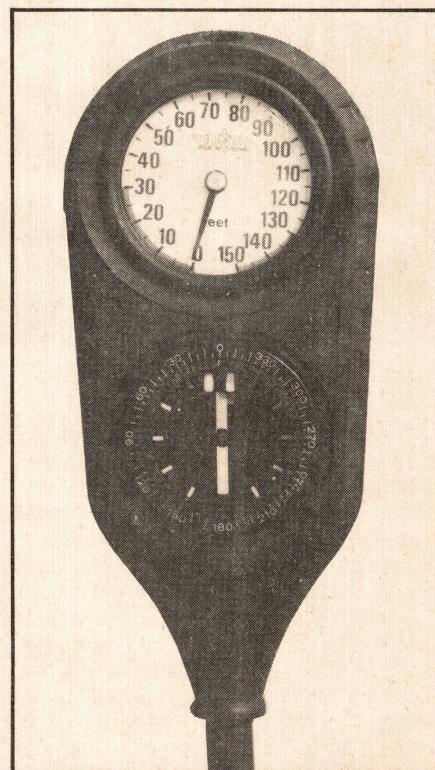
The submersible pressure gauge has a spiral wound bourdon tube mechanism and can handle 4,000 psi. The case is impact resistant Delrin, the crystal, Lexan®. The gauge face is special luminous plastic, which will not crack or peel with age. The face is marked with indicator bars in 100 psi increments and with larger bars every 500 psi and large numbers at 500,

1,000, 2,000 3,000 and 4,000 psi. Zero to 500 psi is marked with sweeping red bars to emphasize low tank pressure.

The console is available with either a 150 or 230 foot depth gauge. Both are the open bourdon tube type and are not oil filled. The depth gauge is designed to be accurate throughout the scale and unaffected by temperature variations. The gauge has an external zero adjustment screw accessible through the console. The gauge face is luminous plastic with bar marks every five feet and numbers at 10, 20, 30 etc. The depth scale is color coded for emphasis, with 0-30 feet green, 30-130 yellow and 130-150 (or 130-230) red. The gauge case is Delrin and the crystal, Lexan.

The SK-5 compass has a shock resistant nylon case and a flexible plastic crystal which transmits pressure throughout the oil filled instrument to prevent cracking. The compass has a jeweled bearing and the needle is dampened by oil to reduce oscillation. The compass is an indirect reading type with a luminous, north seeking needle. The luminous lubber line is at zero degrees and there are bar marks every five degrees and numbers (counterclockwise) every 30 degrees. There are luminous bar marks every 30 degrees as well. The compass has a knurled, rotating bezel and luminous index marks.

The console (with either depth gauge) is \$169.95 at SeaQuest dealers. 



The Suunto Instrument Console has the navigational instruments (depth gauge and compass) together on one side. A 230 foot depth gauge can be substituted for the 150 foot gauge.

BAHAMAS

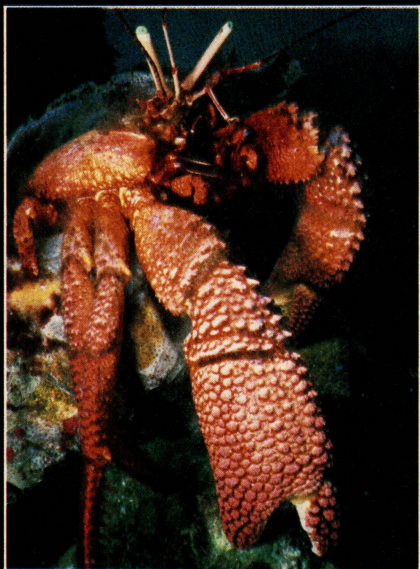
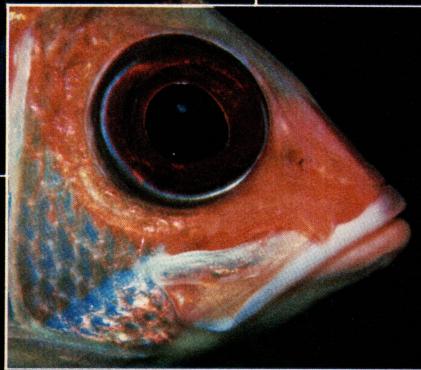
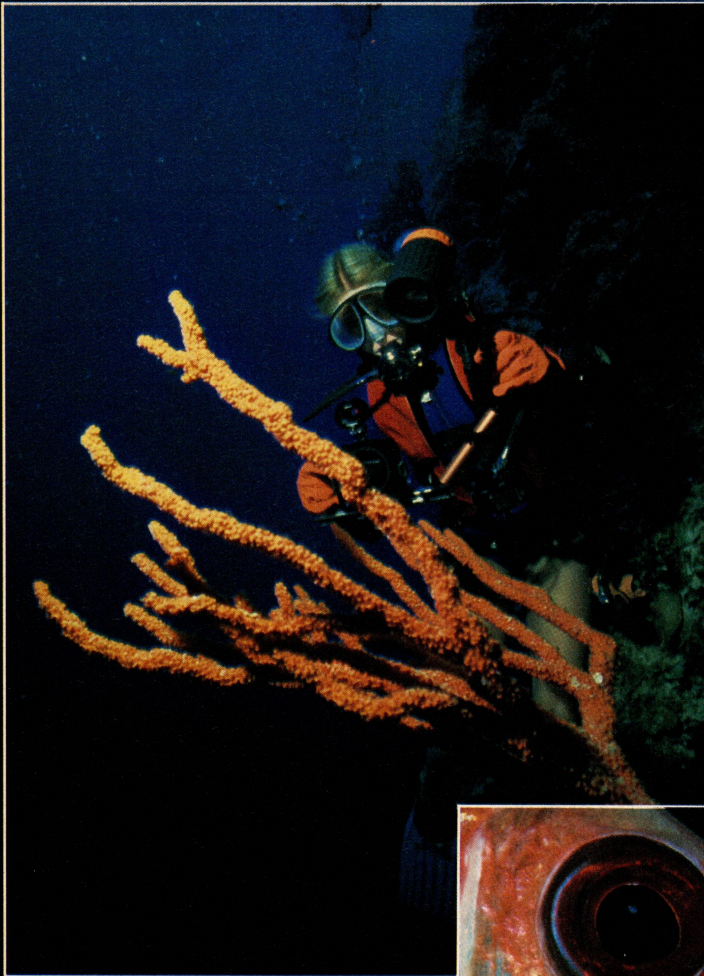
SDM SPECIAL TRAVEL SECTION



**“A Potpourri Of
Diving Adventure”**

BAHAMAS Potpourri

A splendid collection
of dazzling
dive destinations



From invertebrates in vibrant colors to exhilarating encounters with big fish, the Bahamas have an ever-surprising variety of underwater sights and experiences. This archipelago is made up of over 700 islands, 2,000 rocks and cays, and over 100,000 square miles of ocean territory, and much of the area remains untouched by man. All of this is available in water of remarkable clarity with U/W visibility of 200 feet often found along the deep drop-offs.

TEXT AND PHOTOGRAPHY BY GERI MURPHY

The sparkling clear waters and spectacular coral reefs of the Bahamas are legendary. Divers have been visiting these fabulous islands since the earliest days of our sport. For more than 40 years, the Bahamas have served as a mecca for free diving and scuba.

Despite a long history of popularity, the Bahamas never seem to wear out. This vast stretch of 700 islands and 70,000 square miles of blue ocean provide an endless source of fascination and recreation.

And yet, there is some puzzlement about the Bahamas. Returning divers often give contradictory and confusing reports to their friends at home. Some claim the Bahamas have the greatest shallow coral reef diving in the world, while others describe it as wall diving country. Some speak of impressive wrecks, while others talk only of spectacular coral caves and blue holes. Some claim the Bahamas are desolate and tranquil. Others report them to provide swinging vacations with dancing and gambling. Who's right and who's wrong? They are probably all correct.

The Bahamas cannot be regarded as a single island destination (like Bonaire or Roatan). They are actually a potpourri of different worlds where no two islands

are alike. They are a collection of separate and distinct diving adventures and special undersea phenomena.

Consider these two extremes. At one end of the spectrum is New Providence Island, home of the capital city of Nassau. Over 130,000 people live and work in this bustling tropical metropolis. There are high rise luxury hotels, elegant restaurants, lively nightclubs, gambling casinos and freeport shopping. Life here is sophisticated and fast moving. The diving is good, with drop-offs, a couple of shipwrecks and coral caves galore.

At the other end of the scale is Staniel Cay in the mid-Exumas. This is a tiny coral island with an airport, two small hotels and a population of 62 people. The Staniel Cay Yacht Club has six rooms and the Happy People Marina, eleven rooms. Life is quiet and casual. You can shake hands with every resident in a leisurely afternoon—and they are all friendly. Staniel has good wall diving, exciting drift

dives through the cuts and, of course, the world famous **Thunderball Grotto**.

Both New Providence and Staniel Cay are wonderful vacation experiences, but for entirely different reasons. Each offers a full service dive shop, experienced dive operators and memorable dives.

And, in between these two extremes are dozens of other delightful adventures. Collectively, the Bahamas are impressive. There are 28 land based dive operators on 18 different islands. They have more than 2000 scuba tanks, over 50 air compressors and some 60 dive boats. A total of 96 underwater guides lead daily trips to over 500 dive sites. If you take two vacation trips per year to the Bahamas, it would take almost 15 years to see it all!



BAHAMAS

LOCATION

The Bahamas are a vast island nation which starts as close as 50 miles off the coast of Florida. Beginning at a latitude even with West Palm Beach and stretching southeastward 750 miles, the end of the Bahamian isles chain reaches almost to Haiti. Short travel time (less than 30 minutes from Miami to Bimini) and inexpensive flights make the Bahamas an at-



The Bahamas stretch from 50 miles off Florida, almost to Haiti. Bahamasair has jet service from many U.S. cities to both Nassau and Freeport plus daily inter-island service.

tractive choice for any type of trip, ranging from a weekend visit to a more leisurely seven day stay.

FLIGHTS

The Bahamas have one of the most sophisticated networks of airline transportation to be found anywhere in the Caribbean basin. This intricate web of air routes and carriers is owing to the fact that there are so many islands. While most Caribbean destinations have one or two airports, the Bahamas have over 30. This multi-

tude of airports and islands are serviced by no less than 14 scheduled airlines, plus another dozen charter services.

To fully understand and appreciate the airline network, the traveler must remember that each island in the Bahamas is almost a world unto itself. A specific island may be served by one-half dozen air carriers with direct connections to Nassau, Miami, Ft. Lauderdale, West Palm Beach and a number of other U.S. cities. A neighboring island could very well be served by different air carriers and be

AIR SERVICE FOR THE BAHAMAS

AIRLINE	TELEPHONE	U.S. CITIES	BAHAMIAN DESTINATIONS	AIRLINE	TELEPHONE	U.S. CITIES	BAHAMIAN DESTINATIONS
Aero Coach	(800) 327-0010 (U.S.) (800) 432-5034 (Fla.) (305) 525-8555	Ft. Lauderdale, Jacksonville, W. Palm Beach	George Town, Marsh Harbour, N. Eleuthera, Treasure Cay	North American	(305) 493-5065	Ft. Lauderdale, Daytona Beach, Miami, Orlando, W. Palm Beach, Tampa	Freeport
Air Florida	(800) 292-2121 (305) 592-8010	Ft. Lauderdale, Houston, New York, Miami, W. Palm Beach	Freeport, George Town, Marsh Harbour, N. Eleuthera, Rock Sound, Treasure Cay	Pan Am	(800) 442-5896 (N.Y.) (212) 973-4000	New York	Freeport, Nassau
Bahamasair	(800) 327-8080 (305) 593-1910	Atlanta, Ft. Lauderdale, Miami, Tampa	Nassau, Freeport, All Out Islands	Pompano Airways	(800) 327-5581 (305) 524-6505	Ft. Lauderdale	Governor's Harbour, Marsh Harbour, N. Eleuthera, Treasure Cay, Rock Sound
Caribbean Express	(305) 884-6555	Miami	George Town, N. Eleuthera, Rock Sound	State Airlines	(800) 327-3037 (U.S.) (800) 432-3619 (Fla.) (305) 764-4923	Ft. Lauderdale, Key West, Marathon, Miami, West Palm Beach	Andros, Bimini, Chub Cay, Gov. Harbour, Marsh Harbour, San Andros, Treasure Cay, N. Eleuthera
Chalk's International	(800) 327-2521 (U.S.) (800) 432-8807 (Fla.) (305) 895-1223 (Miami)	Ft. Lauderdale, Miami, West Palm Beach	Nassau, Bimini	Transair	(800) 327-7605 (U.S.) (800) 432-7723 (Fla.)	Ft. Lauderdale, Orlando, Palm Beach	Freeport, Marsh Harbour, N. Eleuthera, Treasure Cay
Delta Airlines	(404) 765-5000	Atlanta, Boston, Detroit, New York	Nassau	United Airlines	(312) 569-3000	Chicago	Freeport, Nassau
Eastern Airlines	(800) 327-8376	Atlanta, Boston, Chicago, Detroit, Houston, New York, L.A., Miami, Phila., Ft. Lauderdale	Freeport, Nassau	Walker's Cay Airlines	(305) 523-5947	Ft. Lauderdale, Miami	Bimini, Walker's Cay

linked to different cities.

There are basically four types of air service available in the Bahamas:

- 1) Major airlines from the U.S.
- 2) Inter-island air service from Nassau and other major Bahamian cities.
- 3) Commuter-type airlines from the United States.
- 4) Charter airlines from the United States or Nassau.

Each of these airline categories serve a very important function in the overall transportation system of the Bahamas.

The major jet carriers serve only Nassau and Freeport. For example United has a new flight from Chicago to Nassau and Freeport. Delta offers non-stop service from Atlanta to Nassau. Air Florida flies from Ft. Lauderdale to Freeport. Bahamasair operates jet service from Atlanta, Ft. Lauderdale, Miami and Tampa.

The major air carrier for inter-island flights is Bahamasair. Based in Nassau, this carrier has direct routes to most all of the Bahama islands, radiating from Nassau like the spokes of a wheel. The only problem is that the majority of these inter-island flights connect with Nassau only. If you fly from Nassau to Eleuthera and then want to continue on to Exuma, you must first go back to Nassau.

There are at least seven commuter-type airlines which offer direct service from various U.S. cities to outer island destinations such as Marsh Harbour, Chub Cay or San Andros. These carriers include: Aero Coach, Chalk's, North American, Pompano Airways, State Airlines, Trans-Air and Walker's Cay Airlines. While these carriers are a bit smaller and slower than the big jets, they offer the direct non-stop flights.

The charter airlines provide a service which is particularly important to divers. Islands such as Rum Cay, Staniel Cay and Pittstown Point (Crooked Island) do not have regularly scheduled airline service. The only mode of travel available is charter flights which are generally arranged by the dive resorts.

PRIVATE FLIGHTS

Another mode of transportation certainly worth mentioning is private aircraft. Of all the islands, the Bahamas are perhaps best suited for private aircraft travel. They are within close proximity to the U.S. mainland and close enough to each other to offer a marvelous opportunity for easy island hopping. Furthermore, the Bahamas welcome private pilots, providing them with weather and information support. Runway lengths average 3,000 to 5,000 feet and most are paved. Pilots are urged to travel during the daytime hours only since many runways are unlighted and do not have radar.

For specific information about private aircraft flights, weather and customs clearance, pilots should call the Bahamas Pilot Briefing Center. The U.S. toll free number is (800) 327-3853 or (800) 432-

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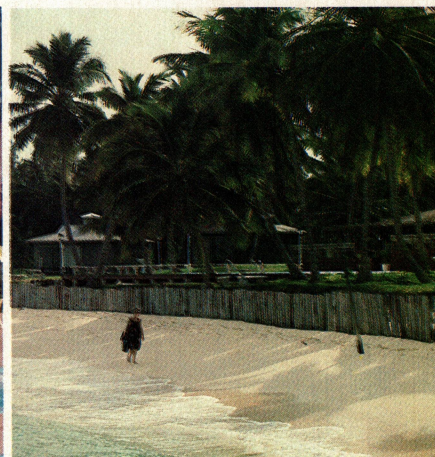
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ENTRY REQUIREMENTS

Entry into the Bahamas is rather simple. Passports are not required for citizens of the U.S., U.K. or Canada. All that is required is proof of citizenship, such as a birth certificate or voter's registration card. A driver's license does not qualify as proof of citizenship. Bahamian immigration law also requires a return airline ticket and a completed immigration entry card. This short form is usually distributed to passengers during the flight to the Bahamas and collected from the immigration officer upon arrival. It is recommended that a ballpoint pen be used to ensure a legible carbon copy. The immigration officer will review the card, sign it, stamp it and give you the carbon. Don't lose or throw away the copy. It must be presented to the immigration officer again when you leave the Bahamas.

After clearing immigration, you will be required to pick out your luggage and present it for customs inspection. Tourists make a verbal declaration of the contents of their baggage, but it is subject to inspection by the customs officer.

Under no circumstances should a visitor attempt to smuggle illegal drugs into the Bahamas. Bahamian drug laws are severe and violators will be promptly arrested and prosecuted. Penalties include very large fines and long jail terms. Also, many divers are surprised to learn that it is illegal to bring spearguns into the Bahamas (as well as any gun or firearm). The Bahamians have wisely chosen to protect their largest natural resource, the sea creatures, and have therefore instituted laws for fishing. Spearfishing with scuba is not allowed although snorkelers may use polespears. Suffice it to say, leave your spearguns at home or they will be confiscated by customs.

MONEY

The Bahamas have their own system of currency which is very similar to that of the U.S. One Bahamian dollar is equal to one American dollar, so there are no problems figuring out conversion rates. The taxi drivers and merchants will accept U.S. dollars as readily as Bahamian dollars, although they may have to give you change in Bahamian currency. In addition to the widespread acceptance of U.S. dollars, most Bahamian hotels and large restaurants will accept traveler's checks and major credit cards.

WEATHER

Although the Bahamas are on the northern edge of the Caribbean (bordering the Atlantic), the weather is warm year-round. The average high temperature is 85°F while the average low is

70°F. During the winter months, the water temperature drops to about 74°F and a lightweight wetsuit is recommended. The summer months bring the water temperature up to about 82°F and while a wetsuit may not be necessary, a shorty or jacket is preferred for protection against the corals.

WHAT TO WEAR

The type of clothing you pack for your Bahamas trip will depend on what island you are planning to visit. If you are going to Nassau or Freeport, a more formal wardrobe might be in order if you plan to visit the gambling casinos, dine out or go shopping. Lightweight slacks, sportshirts and a sportcoat would be appropriate.

The out islands with smaller resorts are much less formal. T-shirts, jeans, shorts and sandals are generally worn during the day, with casual slacks and a lightweight shirt for the evening.

ELECTRICITY

The Bahamas are on the standard North American electrical system of 120 volts at 60 cycles. Electrical converters and outlet adapters are not required. However, there can be some fluctuation in voltage on some of the smaller islands where private generators are in use. Divers using chargers for underwater lights and strobes should first check with the hotel management or dive shop before plugging in any charging equipment.

ABACO

The Abacos are a cluster of cays (small islands) surrounding the larger islands of Great Abaco and Little Abaco. Curved like a boomerang, the Abaco group runs approximately 130 miles northwestward in an arc ending at Walker's Cay. There are five operators currently providing dive services in three areas of the Abacos: Marsh Harbour/Hopetown, Treasure Cay and Walker's Cay.

Marsh Harbour is the central district of Great Abaco and the third largest city in the Bahamas. Daily flights from Florida and Nassau provide convenient air service to this region. Hotels are three to four miles away. There are three dive operators in this area, each offering distinctively different services. DIVE ABACO LTD. is at the Marsh Harbour Marina and operated by Skeet LaChance. This is an independent dive operation which provides services for several of the surrounding hotels including Great Abaco Beach Hotel, Lofty Fig Villas and the Conch Inn. La Chance runs half day dive trips, offering one or two tank dives, depending on the guests' preference. He also provides scuba tank rentals to yachts and sailboats in the Marsh Harbour area.

Hopetown is a picturesque settlement on the small offshore island of Elbow Cay and is reached by ferry boat via Marsh Harbour. Marked by a distinctive red and

white candystriped lighthouse, Hopetown looks more like an early New England seaport than a Bahamian island. The ELBOW CAY CLUB, just south of Hopetown, offers limited diving services to guests of the hotel. Another dive operator in the Hopetown area is Dave Gale, owner and operator of ISLAND MARINE. Dave has a unique combination outboard motor repair shop, boat rental service and dive shop. Island Marine works closely with diving guests who are staying at the Abaco Inn.

Diving in the Marsh Harbour/Hopetown area consists mostly of shallow to medium depth reef exploration, snorkeling and a wreck dive. **Maxi Cave** is a coral ravine that ends in a large grotto at about 25 feet. **Sandy Cay** is a magnificent coral garden at the south end of Pelican Cay National Preserve. The **USS Adirondack** is the wreck of a Civil War gunboat of the Union Navy lying in 10 to 25 feet of water.

TREASURE CAY BEACH HOTEL is approximately 30 miles north of Marsh Harbour. The Treasure Cay Airport is only 10 minutes away. This elegant country club style resort offers the full range of vacation activities including golf and tennis.

The Treasure Cay Dive Center offers two scuba diving trips each day and provides instruction for hotel guests.

GEOGRAPHIC GUIDE TO DIVE OPERATIONS

ISLAND	DIVE OPERATION
ABACO	
Hopetown	Elbow Cay Club
Hopetown	Island Marine
Treasure Cay	Treasure Cay Dive Center
Marsh Harbour	Dive Abaco
Walker's Cay	Walker's Cay Resort
ANDROS	
Fresh Creek	Small Hope Bay Lodge
Nicholl's Town	Andros Undersea Adventures
BERRY ISLANDS	
Chub Cay	Chub Cay Club
BIMINI	
North Bimini	Bimini Undersea Adventures
CROOKED ISLAND	
Pittstown	
Point Landing	
ELEUTHERA	
Harbour Island	Romora Bay Club
Harbour Island	Valentine's Yacht Club
Rock Sound	Winding Bay Dive Center
Spanish Wells	Spanish Wells Resorts
EXUMA	
George Town	Exuma Divers
Staniel Cay	Staniel Cay Divers
NEW PROVIDENCE	
Nassau	Bahama Divers
Paradise Island	Carib Divers
Nassau	Coral Harbour Divers
Nassau	Nassau Dive Supply
Lyford Cay	South Ocean Beach
Coral Harbour	Smuggler's Rest
Nassau	Sun Divers Limited
Nassau	Underwater Tours
GRAND BAHAMA	
Freeport	Underwater Explorers Society
West End	Jack Tar Village
LONG ISLAND	
Stella Maris	Stella Maris Inn
RUM CAY	
Rum Cay	
Diving Club	

One of the best snorkeling spots is **Guana Gardens**, a sprawling coral garden covering 50 acres of ocean floor. The **Civil War Wreck** is the fascinating remains of a century old paddlewheel blockade runner. **No Name Wall** is a mini drop-off, reaching from the surface to 50 feet.

WALKER'S CAY is the northernmost island of the Bahamas, at the top of the Bahamas chain. It is a compact, self-sufficient resort which occupies the entire 100 acre island. This resort even operates its own airline with daily flights from Ft. Lauderdale. Although Walker's is well known for good sportfishing, there is also good diving here.

Nick's Caverns is probably the most popular dive site at Walker's Cay. Less than two miles from the hotel, this unusual dive site features three acres of coral reef, consisting of interconnecting tunnels, caves, archways and grottoes.

ANDROS

Twenty miles west of Nassau is the giant island of Andros, the largest land mass in the Bahamas chain. Running parallel to the eastern shoreline of this huge island is a 142 mile long barrier reef—one of the largest in the world. It lies an average one mile offshore and the outside edge is a spectacular drop-off.

There are two dive resorts on Andros, Small Hope Bay and Andros Undersea Adventures. Both of these resorts are owned and run by divers, for divers.

SMALL HOPE BAY LODGE is six miles from the Andros Town International Airport. This cozy little beach resort has been catering to dive enthusiasts for over 24 years, run by the original founders, the Birch family. The rooms are actually private cabins on the beach, protected by tall casuarina pine trees. The main lodge feature a large living room, a shipwreck bar, a fireplace, a game room and library and a dining room. The large redwood hot tub, which sits close to the beach, is very popular.

Small Hope Bay offers superb diving, with some of the most spectacular drop-offs to be found anywhere. Just beyond the barrier reef is a drop-off which begins at about 75 feet and drops straight away to 6,000 feet. This abyssal deep is known as the Tongue of the Ocean. Fish activity is impressive, with frequent sightings of eagle rays, sea turtles, jacks and many other pelagics. The divemasters have just recently discovered a gigantic ocean blue hole which opens into a mammoth undercavern—**King Kong's Cave**.

ANDROS UNDERSEA ADVENTURES is a brand new dive resort that has just been established at the northern end of Andros, close to Nicholl's Town. It is Neal Watson's (well known owner and developer of Bimini Undersea Adventures) second operation. It is a full service dive resort including a beautiful hotel on the beach, two dive boats, two divemasters

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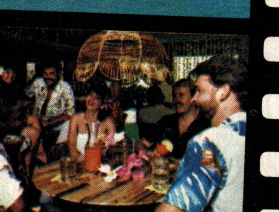
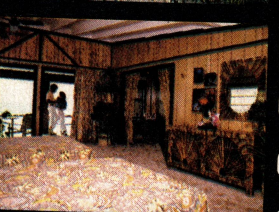
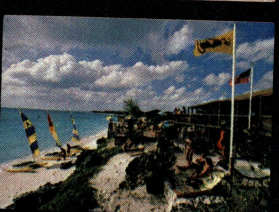
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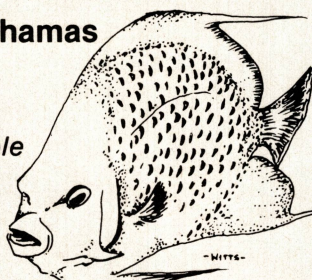
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The hotel portion of the resort is known as the Andros Beach Hotel and Villas and will be managed by Neal's brother, Carl. The diveboats are similar to the large deep V-hull custom boats used at Bimini.

The coral reefs and drop-offs at the northern end of Andros are virgin and not yet named. There is excellent wall diving a quarter mile directly out from the hotel, as this is the area of the Andros Barrier Reef which comes closest to the shoreline. The area is known as **Nicholl's Town Wall** and the top of the drop-off begins at 70 feet. Other underwater attractions near the resort include a 150 foot wooden hulled shipwreck, a 30 foot diameter ocean blue hole and a labyrinth of coral caves and tunnels in an area known as **Hens and Chickens**. There is also an island blue hole five miles from the hotel which can be used in the event of stormy weather.

BIMINI

Bimini is the island closest to the Florida mainland—50 miles east of Miami. Bimini is really a group of islands consisting of North and South Bimini, Cat Cay and Gun Cay. North and South Bimini are separated by a narrow ocean passage. South Bimini is a sparsely populated island with an international airport for commercial flights, many of which originate out of Ft. Lauderdale. Visitors take a taxi from the airport to the dock and then cross the channel by ferry to reach North Bimini. It is North Bimini that features the principal shopping centers, hotels and diving facilities. As an alternative, many divers fly directly into North Bimini by seaplane. Chalk's International provides daily air service from Miami directly to the main street of North Bimini.

The island of North Bimini is seven miles long and only 700 feet wide. Alice Town is the center of activity, featuring five hotels and almost a dozen bars and restaurants, all within walking distance of the airline ramp. Accommodations range from an economy package at Blue Waters Hotel to a deluxe dive package at the Bimini Big Game Club.

BIMINI UNDERSEA ADVENTURES is right at the dock next to Brown's Hotel, with three dive boats berthed at the dive shop doorstep. Owned and operated by Neal Watson, this facility specializes in dive group services and offers attractively priced scuba packages for weekend quickies or full week vacations. Neal is an independent operator who works closely with the hotels, providing complete packages with the one of your choice. Neal is a dynamic individual who has a long list of underwater accomplishments to his credit. He is often described as "the div-

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The Berry Islands feature great reef and wall diving on the deep shipping lanes that bisect The Bahamas.

Bimini is right on the three-knot Gulf Stream. A haven for drift divers.

Eleuthera has beaches of pink sand. There are lots of wrecks on the aptly-named Devil's backbone, including a Civil War train wreck.

The Exumas are in the middle of the warm southern Bahamas.

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Rum Cay, one of the smallest islands, known for its wall diving and tame groupers.

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er's diver."

There are many excellent coral reefs and dive sites in the Bimini area, ranging from shallow sea gardens for snorkeling to deep vertical drop-offs for drift diving. One of the most requested dives is the **Continental Shelf**, a spectacular drop-off only 10 minutes from the dock. The wall begins anywhere from 90 to 140 feet with visibility ranging from 100 to 200 feet. The top edge of the wall is covered with a forest of deep sea gorgonians, large black seafans and sponges. This is a drift dive with currents ranging from two to five knots. Divers effortlessly sail along the face of the wall, taking in the sights as they travel.

North Bimini is sort of a cross between a frontier town and a game fisherman's haven. The docks are jammed with sleek sportfishing cruisers and every bar in town (there are many) is decorated with sailing and fishing pictures. The town is lively and there are many restaurants.

CHUB CAY

Also perched on the very edge of the Tongue of the Ocean, Chub Cay has long been popular with sportfishermen. Established more than 20 years ago, the CHUB CAY CLUB is a totally self-sufficient resort with its own airport, desalinization plant, power plants, restaurants and marina. Marina hotel accommodations are conveniently located next door to the dive shop. State Airlines and Pompano Airways offer air service to Chub Cay from Ft. Lauderdale. Keys Airlines has service from Miami and Lucayan Air operates flights from Nassau and Freeport.

The dive operation at Chub Cay is managed by Dick Yax, who is also the resort manager. Dick, who was once the divemaster, has discovered dozens of excellent dive sites over the past four years and takes great delight in giving visitors an exciting trip. The schedule allows for three tank dives a day except on days of arrival and departure. Two dives are made on the morning trip and one dive in the afternoon. A night dive can be substituted for an afternoon dive with a majority vote.

One of the best wall dives in the Bahamas is **Chub Cay Wall**, a vertical drop-off where schools of horse-eye jack, crevalle jack and eagle rays are often seen. For a medium depth reef, try **The Salad Bar**. This is a sloping coral reef ranging in depth from 60 to 100 feet. This site has good black coral and plenty of marine life. For good snorkeling, **Mama Rhoda Rock** is considered to be one of the best areas in the Berry Islands. This reef is a sprawling shallow garden loaded with elkhorn and staghorn corals.

ELEUTHERA

Eleuthera is a long, thin island east of Nassau and south of Abaco. This string-bean shaped island is more than 100 miles long, but only one and one-half miles wide. There are four dive resort operators on Eleuthera, three of which are in the north and one in the south. For the most part, the diving is in shallow or medium depths without drop-offs.

At the north end of Eleuthera are two small islands which provide diving services; Harbour Island and Spanish Wells. Visitors fly into the North Eleuthera Airport, take a taxi to the ferryboat and transfer to their final destination.

Harbour Island is a distinguished resort island which lies two miles off Eleuthera's northeast corner. There are two dive operations here and the ferryboat captain

pine trees, palm trees, fruit trees and flowers. A mile away is the VALENTINE'S YACHT CLUB which is a combination yacht facility, hotel and dive shop. Owned and managed by Jack Valentine, the club caters to sailors, fishermen and divers.

SPANISH WELLS RESORTS are on the eastern end of St. George's Cay, about 12 miles from the North Eleuthera Airport. A taxi takes you to the James Bay Ferry Landing to catch a water taxi to the island. The settlement of Spanish Wells is quite unique with its little "salt box" houses neatly arranged with well manicured gardens. It is a prosperous and successful community of hard working fishermen and virtually crime-free.

Spanish Wells Resorts are actually two properties; the Spanish Wells Beach Resort and the Spanish Wells Harbor Club.

Spanish Wells has marvelous shallow coral reefs with many colorful invertebrates, as well as the ultra-thrilling experience of drift diving at the famous Current Cut.



will take you to the dock of either one, as they are both on the water's edge. The ROMORA BAY CLUB is perched on a hillside with a beautiful view of the bay. This resort is a little more formal than most. The cottages, bungalows and units are partially hidden in a tropical garden of

The Beach Resort is on a white sand beach and the Harbor Club faces the harbor. Both resorts are managed by Lill Campbell. The manager of the Spanish Wells Dive Center is Desi Stephens, an SSI instructor. Desi has been the dive-master at Spanish Wells for five years.

The diving around North Eleuthera offers some rather unique opportunities not found elsewhere. One of the best known areas is the Devil's Backbone, where numerous shipwrecks litter the bottom. One of the more photographic wrecks is the **Train Wreck**. Sunk in transit during the Civil War, some parts of the train are still recognizable, including three solid steel locomotive wheels and three smaller sets of wheel trucks. The depth is 15 feet.

The largest shipwreck found on Devil's Backbone is the *Cienfuegos*, a 200 foot passenger steamer that sank in 1895. There is a beautiful coral tunnel right under the bow section which runs 50 to 75 yards long with small rooms and chambers branching off to the right and left. Depths range from 10 to 30 feet.

The WINDING BAY DIVE CENTER is about seven and one-half miles from the Rock Sound Airport. At the Winding Bay Beach Resort, the dive center caters to divers who are guests of the hotel. The resort is on the beach with facilities including: pool, waterskiing, fishing and tennis. A jacket and tie is required at dinner during the winter season.

Diving in the Winding Bay area consists of shallow to medium depth coral reefs. **Beginner's Reef** is a snorkeling site in 2-15 feet of water. **Finger Reef** is a larger coral formation in 35 feet of water. **Horseshoe Cave** is a 120 foot long coral tunnel which curves through the reef in a U-shaped configuration.

EXUMA

The Exuma Cays are in the center of the Bahamas, with the northern tip 35 miles southeast of Nassau. There are more than 350 islands and cays stretching a span of 90 miles. There are two dive operators in the Exumas.

Staniel Cay is a speck of an island midway down the Exuma chain and headquarters for Capt. Bill Crawford and the STANIEL CAY DIVERS. Crawford is an expert underwater photographer and veteran dive boat skipper from the Florida Keys. Crawford's divemaster skills and charming wit are legendary. He has now established a complete dive charter service for the mid-Exumas and operates one of the smallest and best stocked dive stores in the Bahamas.

Staniel Cay covers less than one square mile but has a 3,000 foot airstrip for private and charter planes, which can be scheduled through Trans Mar Intl. The Staniel Cay Yacht Club and Marina is within wading distance of the airport.

The Major diving attraction at Staniel Cay is **Thunderball Grotto**, named after

the James Bond movie which was filmed at this site. Less than one mile from the dive center, this large, submerged cavern is so unique that film crews recently returned to film another Bond movie, *Never Say Never Again*. The interior of the cave is over 100 feet long and two-thirds of the grotto is above water at low tide. Divers can snorkel or scuba dive here. There is excellent wall diving available on the outside or Exuma Sound side of the island.

George Town is the largest settlement in the Exumas and is at the southern end

of the chain. This friendly resort community has an international airport, several hotels and is host to the yearly Family Island Sailing Regatta. George Town is the home of the EXUMA DIVING COMPANY, an independent dive charter service operated by Wendle McGregor. McGregor is a certified instructor and provides basic scuba instruction and daily dive trips for guests of the Peace & Plenty Hotel.

The George Town area offers diving opportunities in shallow to medium depth waters, with the deepest reef at 50 feet.

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BAHAMAS

These reefs are excellent for snorkeling, beginning scuba divers and underwater photographers. There are also five ocean blue holes in the area, all well protected and easy to dive. These holes are filled with reef fish, lobsters and a sprinkling of marine life. Depths range from 20 to 90 feet and lights are recommended.

FREEPORT

Freeport is an ultra-modern resort city on Grand Bahama, one of the largest islands that lies close to the coast of Florida. It is only 100 miles from Ft. Lauderdale to Freeport and a large international airport accommodates daily jet flights from Florida, New York, Chicago and other U.S. cities.

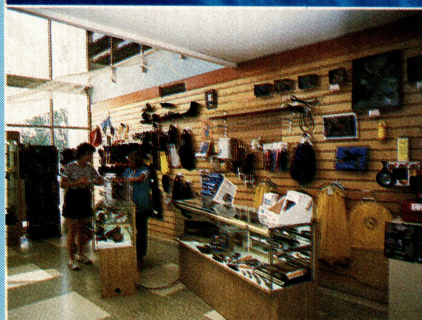
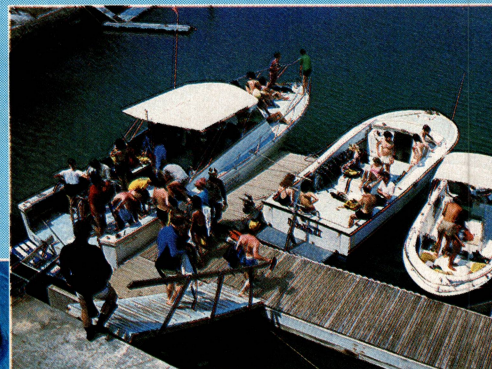
Freeport is a very modern city, built in the last 25 years specifically as a vacation paradise. It features wide, beautifully paved roadways, neatly landscaped boulevards and luxury high-rise hotels surrounded by flowering gardens. The entire area has a country club atmosphere and the city is well known for its championship golf courses and more than 60 outdoor tennis courts. In addition to the multitude of outdoor activities, there are 20 fine restaurants, an elegant casino and a number of nightclubs.

Perhaps the most outstanding feature of Freeport, from a diver's point of view, is that this resort city is the home of the world famous UNEXSO. It is by far the most futuristic and most sophisticated diving resort facility in the Bahamas and perhaps in all the Caribbean.

UNEXSO offers a number of unique features not ordinarily found at an independent dive facility. For example, there is an olympic-size swimming pool for beginning scuba class. Adjacent to the pool is a spacious 18 foot deep training tank, large enough to accommodate 20 or more divers. The walls of the tank have large windows so visitors can observe advance scuba classes going through their exercises.

The heart of UNEXSO is a large retail sales area which is a veritable showcase for every type of diving equipment imaginable. There is a dive trip planning board which indicates which boats are going to selected dive sites. Adjacent to the main sales area is a diving museum, classroom, equipment locker, huge air compressor and recompression chamber.

UNEXSO can be best described as an institution of higher learning for scuba. More than a dozen different types of classes are scheduled on a regular basis. They range from introductory to scuba instructor certification. The most popular are the specialty courses in night, deep and wreck diving, living off the sea and marine identification. UNEXSO has three



UNEXSO, the pride of Freeport, is regarded as one of the most modern and sophisticated dive resorts in the Bahamas. With an 18 foot deep training tank and large dive boats, the organization offers a wide range of underwater education programs.

large deep V-hull dive boats which are scheduled for reef trips every two hours.

Freeport has several spectacular vertical walls which offer superior visibility and impressive sponges. One very unique deep dive is a site called **The Cup Handle**, an odd coral formation which juts outward from the vertical face of the drop-off. This coral archway is shaped much like the handle of a giant teacup with an inside diameter large enough to swim through. The formation hangs out over the abyss with gorgonian fans, sponges and corals covering everything. This spot is restricted to expert divers who have graduated from UNEXSO's decompression diving course.

Freeport also offers a wide selection of shallow to medium depth coral reefs. **Littlehale's Lair** is a massive coral reef formation at 80 feet. **The Caves** is a splendid reef site in 60 feet of water. **Treasure Reef** is a beautiful coral reef garden, ideal for snorkeling.

The biggest attraction at the moment is an exciting dive at a sunken ship called **Theo's Wreck**. This obsolete 230 foot steel cargo ship was deliberately sunk in

100 feet of water last year as part of an artificial reef experiment. It now lies on its port side close to the edge of the drop-off at the famous **Grand Bahama Ledge**. Divers can sit on the rudder of the ship and look out over the drop-off into 2,000 feet of water. The wreck has already begun to attract a great deal of interesting marine life, including many schools of pelagic fish.

In addition to scuba training and diving adventure, UNEXSO is also the social center for divers in this part of the world. The second floor of the UNEXSO facility is a large cocktail lounge which serves light breakfasts and lunches during the day and drinks and entertainment in the evening. Known as the Tide's Inn, this unique facility is a favorite haunt for local diving buffs, visiting scuba celebrities and guests who are utilizing the club's services. The highlight of the day is lunchtime, when hamburgers and hot dogs are grilled on an outdoor barbecue.

NEW PROVIDENCE ISLAND

New Providence Island is the heart and

soul of the Bahamas. It is here that over 60 percent of the entire population lives and it is here that you will find the magical city of Nassau.

New Providence is a dichotomy of cultures. On one hand, there is the quaintness and charm of the old Bahamian ways. Fishing sloops are still tied to the wharf with old timers cleaning heaping piles of conchs. A giant straw market provides an incredible showcase of local handicrafts. A visitor can take a historic tour of the 300 year old seaport city (Nassau) in the open air pleasure of a horse-drawn carriage.

On the other hand, there is the new world of luxurious high-rise hotels, splendid golf courses and exciting gambling casinos. The new 700 room Cable Beach Hotel is an absolutely magnificent pleasure palace and by far the largest hotel in the Bahamas. Downtown Nassau offers great opportunities for window shopping, freeport purchases, the best of restaurants and nightly entertainment.

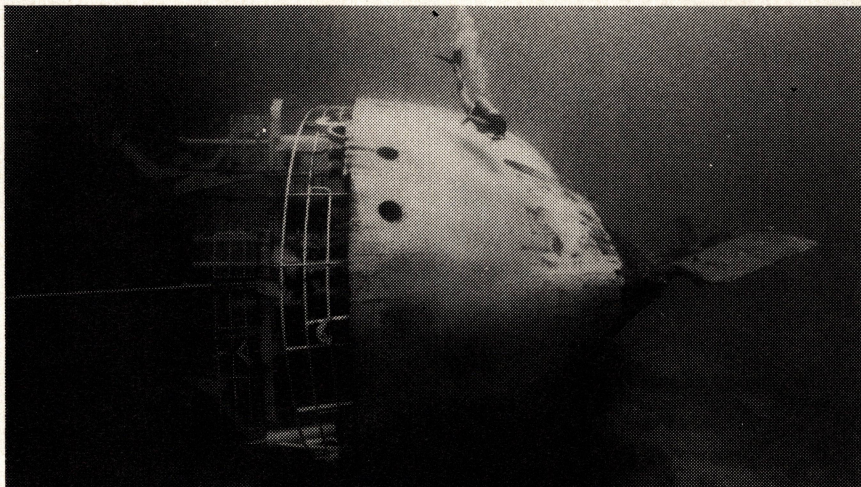
There are two distinctly different types of diving experiences available on New Providence Island. One is the typical shallow water reef trip for non-divers who are being introduced to the world of scuba. The other is a less structured trip to medium depth coral reefs and drop-offs. Surprisingly enough, New Providence Island offers some excellent wall diving, particularly at its west end. The key to a successful dive experience is to distinguish between the two types of trips.

BAHAMAS DIVERS LTD. is in the shopping arcade of the Pilot House Hotel. It is primarily a tourist/diver facility which operates daily boat trips for snorkelers and introductory scuba students. CARIB DIVERS LTD. is a small, personalized dive operation at Loews Harbour Cove. It caters to the guests staying at the hotel. SUN DIVERS LTD. is a scuba and snorkeling dive service right on the premises of the Sheraton British Colonial Hotel. It operates daily dive trips to nearby reefs as well as resort scuba classes. UNDERWATER TOURS and NASSAU DIVE SUPPLY is a combination dive shop, scuba school and reef tour service. The shop has a full inventory of dive equipment plus a classroom and training pool directly behind the store at Yacht Haven, next door to the Pilot House.

The Nassau area of New Providence Island offers a fine selection of shallow to medium depth coral reefs. **Rose Island** is one of the most popular locations for beginning scuba divers and snorkelers. **Green Cay Reef** is a 35 foot reef with beautiful elkhorn and staghorn formations. **Paradise Island Caves** is a very fine spot in 50 feet of water which offers an opportunity to explore undercut ledges and photograph reef fish. The **Ma-honey Wreck** is a large steel ship in 40 feet of water which offers a good chance to pet Nassau groupers and photograph moray eels.

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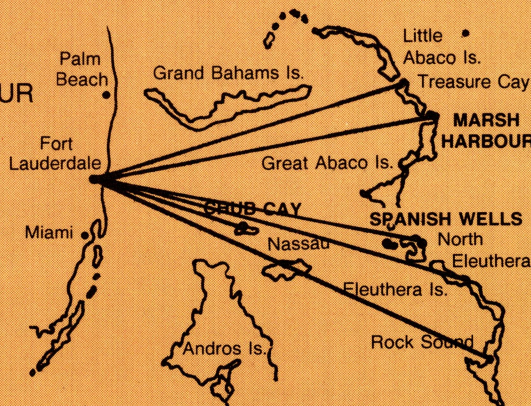
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BAHAMAS

There are three dive operations outside the Nassau area, toward the west end of New Providence. **SOUTH OCEAN BEACH DIVERS** is a reef diving charter service on the beach of the elegant South Ocean Beach Hotel. This giant country club style resort is on a sprawling 5,000 acre private estate which includes an 18 hole PGA Championship Golf Course and clubhouse. The resort has a 120 room hotel, cordial dining room, cocktail lounge, swimming pool, four tennis court and a lovely white sand beach.

South Ocean Beach Divers is a full service dive center. Dive trips are conducted twice daily and night dives are run on special request. The chief divemaster and shop manager is Rudy Turnquist, a Bahamian who knows the reefs like the back of his hand. South Ocean Beach Divers is blessed with some really fine reefs and drop-offs quite close by.

Clifton Wall is a beautiful drop-off, beginning at 35 feet. It has excellent purple tube sponge formations. **Tunnel Wall** is quite a different drop-off with giant crevices and many winding tunnels. **Rudy's Reef** is another fine drop-off with a coral garden along the top. **Goulding Cay** is very impressive, with an elkhorn forest. **Lyford Cay Wall** starts at 60 feet and plummets to over 2,000. The wall is loaded with black coral, tube sponges and many large pelagic fish.

CORAL HARBOUR DIVERS, owned and operated by Stuart and Tula Cove, is at the Casuarinas Apartment Hotel. This is a 36 suite resort property in the Cable Beach area, four miles west of Nassau. They have two large boats and specialize in working with dive groups of 8-10 persons. They conduct trips for both beginners and experienced divers. One of their more popular dive sites is **James Bond Reef**, a staghorn formation in 30 feet of water. Their best wreck dive is the **Tears of Ali**, a 120 foot intact freighter in 40 feet of water. Their best drop-off is **Porpoise Pens Wall**, which begins at 40 feet and drops vertically.

SMUGGLER'S REST DIVE RESORT is an ideal facility for the economy minded diver seeking good accommodations at a good price with plenty of diving. This guest house facility is on a boat cannal in the Coral Harbour area. The resort consists of a number of separate bungalows holding two to four beds each. It can accommodate up to 26 guests. The resort has two air compressors and two dive boats. Dive sites are approximately 40 minutes away from the resort and the boat trips are usually a full day session with lunch on board. This resort has its own selection of dive sites in the Coral Harbour area. Two of the best wall diving

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locations are **The Slide** and **The Cliff**. Coral reef dives include **The Grotto** and a place called **Pumpkin Patch**. One of the best locations for fish action is **Southwest Reef**.

PITTSTOWN POINT

Crooked Island is one of the most remote and untouched islands in the Bahamas chain. It is more than 430 miles from Ft. Lauderdale and takes more than three hours to reach by private aircraft. Crook-

ed Island has no commercial aircraft runway for it is still an outpost on the wilderness frontier.

PITTSTOWN POINT LANDINGS is at the very northern tip of Crooked Island. It is a modest out-island beach hotel facility with 12 rooms, a small dining room and combination lounge and game room. This facility is primarily an island retreat for private pilots who can get there in their own planes. Adjacent to the hotel is a short, 2,300 foot grass and sand runway which

can accommodate small single engine and twin engine aircraft.

Recreational facilities at Pittstown Point are limited. Most guests spend their time simply relaxing on the beach. There is a modest scuba setup at the hotel, including an air compressor, tanks and an aluminum skiff for trips to the reef. Snorkeling at this resort is good, as the shallow coral reef comes right up to the shore, only a few feet from the hotel rooms.

RUM CAY

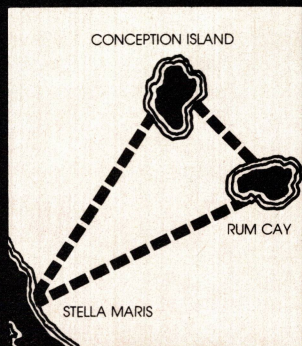
Rum Cay, 375 miles from Ft. Lauderdale, lies in the southeastern part of the Bahamas. The RUM CAY DIVING CLUB is a small but modern resort which offers all the facilities of a large, luxury hotel. The resort has only 17 rooms, but a large staff of divemasters and maintains a full service dive center with 200 scuba tanks. The brainchild of Boston philanthropist David Melville, the resort has been completely rebuilt over the past 12 months and is now considered one of the most modern in the Bahamas.

The newly built giant clubhouse has become the central focus of visitors staying at Rum Cay. This two story building sits on a limestone bluff overlooking the sea and contains: a cocktail lounge and bar; a video entertainment corner with Intellivision games; a library and video theater complete with a 19 inch TV, VCR and stereo speakers; a large veranda porch,

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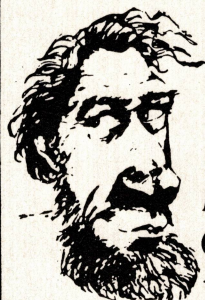
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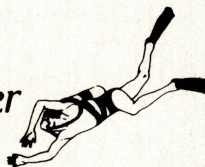


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BAHAMAS

sundeck and boutique. Outside the clubhouse is a hot tub.

The newly built guestrooms are large and spacious suites also overlooking the ocean. The rooms are decorated in a diving motif with underwater photos on the walls. Each room is equipped with a slide viewing box, loupe, fish identification book, desk and chair.

The dive center is a fully air conditioned building with a complete photo lab, lecture classroom with A/V equipment, workbenches and chairs, rental department for scuba gear and cameras and main office. The photo lab is equipped with an automatic E-6 film processor.

Rum Cay has a fine selection of dive sites, including drop-offs, coral cave systems and underwater pinnacles. One of the most beautiful reefs is a spot called **Snow Fields**, 100 yards off the west side of the island. Although it is a 45 minute boat ride, it is worth the trip. This remarkable reef looks like a winter scene high in the Rocky Mountains. The average depth is 30 feet. The bottom is fairly flat and covered with an almost snow-white powdery sand. Rising from the bottom are hundreds of small coral heads five to eight feet tall. These are covered with seafans, seaweeds and sponges.

One of the most impressive dives at Rum Cay is a site called **The Chimney**. Less than one-half mile from the resort, this dive can be reached by boat in five minutes. The top of the drop-off begins at 50 feet. There is a hole in the top of the reef approximately eight feet long and four feet wide. Upon entering it a diver can descend a vertical tunnel or chimney to 90 feet. The bottom of the chimney opens into large coral grotto with a white sand floor. Emerging from the coral grotto, one can follow a sandy ravine that eventually spills out onto the vertical drop-off at 130 feet.

Less than one-half mile from The Chimney is a spot called **Dynamite Wall**. The top of the wall begins at a depth of 80 feet and is covered with a thick bed of staghorn coral. There are dozens of tunnels and narrow canyons etched into the face of the wall.

A good, if not entertaining medium-depth reef is a dive spot known as **Majestic Reef**. Diving depths range from 35 to 50 feet, with massive coral ridges and high coral heads rising up from a sandy bottom. A tame 30 pound Nassau grouper can be fed by hand and will follow divers around the reef.

STELLA MARIS

The STELLA MARIS INN is at the northern end of Long Island, some 26 miles east of George Town. There are several ways to reach Stella Maris. It has its own

charter service from Nassau and Bahamasair has at least three flights a week. The 4,250 foot paved airfield is a half mile from the hotel and aircraft piloted by hotel guests are allowed free landing, parking and tie-down facilities. The Stella Maris Inn is owned and operated by three very amiable Germans; Jorge Friese, Peter Kuska and Gerd Fuhrmann.

The resort consists of a dozen or so buildings set on the side of a hill overlooking the Atlantic. Facilities include a dining room, cocktail lounge, three swimming pools, two tennis courts, a private beach and a large marina. The hotel can accommodate more than 120 people. There are also many beautifully built sea-side homes available for rent. The food at this resort is excellent, with a mixture of European and American cuisine.

The large marina and dive operation is not within walking distance of the hotel, but transportation is provided several times daily. The dive center includes four air compressors, 100 tanks, five dive boats, and a large converted two and one-half ton flatbed truck used for beach dives. The hotel conducts boat trips twice daily, plus additional beach dives and night dives on request.

Of the more than 35 charted dive sites around Stella Maris, the most unique is **Shark Reef**. For several years the dive-masters have been feeding the sharks that visit this reef and have been quite successful in putting on a predictable show. Divemaster Jason Burrows, who has been with Stella Maris for many years, will give photographers a dive not soon to be forgotten.

The Stella Maris Inn will soon be launching the newly built 68 foot custom cruiser, the *Sol Mar III*. This incredible live-aboard vessel will sleep 12 people for overnight excursions to the Exuma Banks and Conception Island.

Conception Wall is a vertical drop-off which begins at 50 feet and drops vertically to 1,000. It is considered to be one of the most beautiful wall dives in the Bahamas, with large trees of black coral, giant gorgonian fans and huge seaweeds. The face of the wall is deeply etched with coral crevices, overhangs and caves.

LIVE-ABOARD BOATS

Cruising on a live-aboard dive boat has become an increasingly popular way of getting around the Bahamas. The obvious advantage of such a facility is more dives per day and thus more diving time for the vacation investment. On most live-aboard boats you can begin the day with a pre-breakfast dive and continue your underwater excursions at your own pace throughout the day. While most people are satisfied with a couple of dives in the morning and a third one in the early afternoon, there are some gung-ho divers who will try to squeeze in four or five dives a day and still be eager for a night excursion. As far as the live-aboard boat



diving, of course... the best

but Small Hope Bay Lodge is so much more. We're palm trees, hammocks along the beach, laughter, wonderful food...and feeling at home.

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A real guest house atmosphere with the dive boat at your front door. A totally integrated full service dive resort: air compressor, scuba tanks, dive boat on the premises. The only dive resort on the water. Adjacent to the best wall diving, coral reefs, and marine life on New Providence Island.

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BAHAMAS

crew is concerned, both types of customers are easy to accommodate.

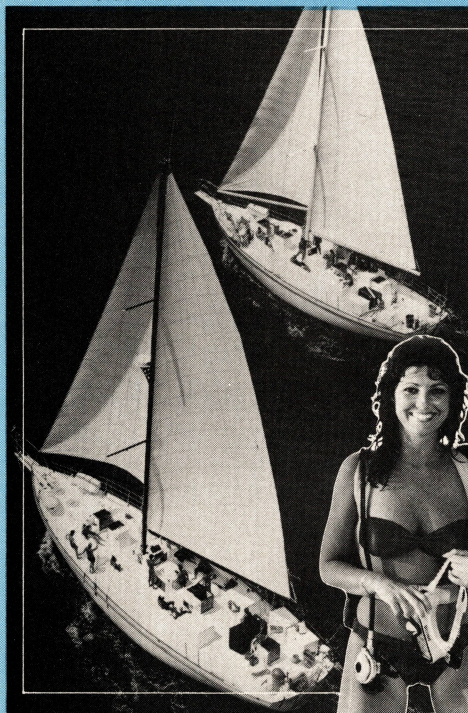
Another advantage of the live-aboard dive boat is that the guests do not have to lug their scuba gear to and from their hotel room. The dive boat is their hotel room and the scuba gear is conveniently stowed close to the boarding ladder, making it even more inviting to make that third or fourth dive. For underwater photographers, the live-aboard vessel can be the answer to their prayers. Not only does your hotel room go to sea, but it also serves as a floating platform for an array of underwater housings, strobes and other bulky photo equipment.

Probably the greatest advantage of the live-aboard dive boat is its unique accessibility to remote spots untouchable by land based resorts. These live-aboard vessels cruise long distances between island groups and frequently stop at uninhabited islands to explore virgin reef areas. Live-aboard guests can actually have the best of both worlds by first diving the popular spots around well known resorts and then moving onto more remote locations for new exploration.

There are, of course, some disadvantages to a live-aboard boat. Cabin accommodations are often compact and living space is limited. There is little privacy aboard a boat filled with divers so you may as well plan on becoming close friends. Night life is rather limited, but then most guests are happy to turn in early after a rigorous day of diving. Most live-aboard boats will spend an afternoon and evening in a port such as Bimini or Freeport just to change the pace. If you can handle these types of living conditions for four to ten days, then a cruise on a live-

BAHAMAS DIVE CRUISE BOATS

Blackbeard's Cruises P.O. Box 52-2225 Miami, FL 33152 (800) 327-9600 (305) 888-1226	<i>Sea Explorer</i> (65') <i>Morning Star</i> (65')
Bottom Time Adventures P.O. Box 030100 Ft. Lauderdale, FL 33303 (305) 524-8352	<i>D/V Bottom Time</i> (65')
Out-Island Oceanics, Inc. 800 S.E. 17th St. Ft. Lauderdale, FL 33316 (305) 791-6763	<i>R/V Sea Dragon</i> (65')
R/V Dragon Lady 1408 N.E. 2nd Ave. Ft. Lauderdale, FL 33304 (305) 764-0354	<i>R/V Dragon Lady</i> (71')
Sea Fever Cruises P.O. Box 144816 Coral Gables, FL 33114 (305) 448-0711	<i>Sea Fever</i> (90')
Seaventures International P.O. Box 3271 Indialantic, FL 32903 (305) 723-9312	<i>Impossible Dream</i> (65')



aboard dive boat can be an extremely satisfying dive vacation experience.

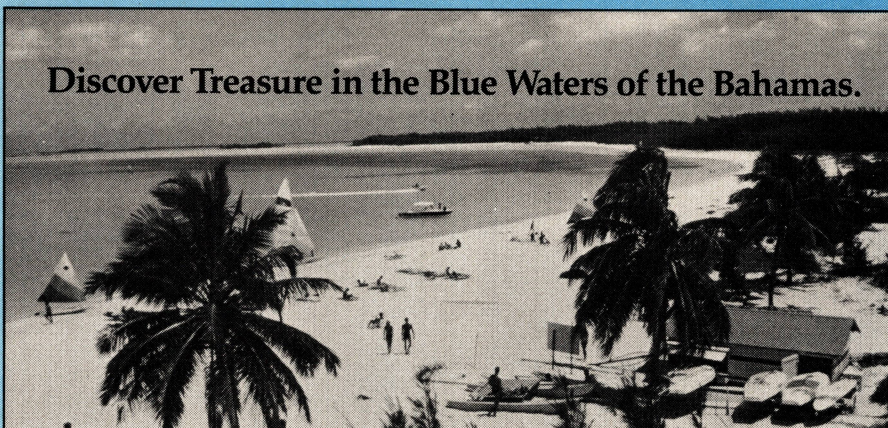
DIVING PASSPORT

There is an organization in the Bahamas known as the Bahamas Diving Association, established for the purpose of developing new ideas and programs for the future development and growth of diving in the Bahamas. Working together with the Bahamas Ministry of Tourism, this association has come up with a unique and exciting concept called the Diving Passport. It is a way that divers traveling to the Bahamas can earn credits toward a free dive vacation.

The association has designed and produced a passport which is similar in size to the U.S. passport, but carries the gold crest of the Bahamas Diving Association. This is being offered to the public for a nominal fee of \$3 and anyone planning to visit the Bahamas can obtain one. On the inside cover there is space for the diver's photo, required for the validation of this document. The photo should be sent with the passport application fee, so that it can be affixed with the official seal.

To use the passport, the visitor need only present it at the end of his/her dive vacation to have it validated by the dive operator. An entry is then made showing the date, dive resort location and number days diving. The resort will also note this

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Dive Operator	Manager	Guides	Dive Boats	Tanks	Hotel(s)	Rooms	Mailing Address	Phone(s)	Remarks
Andros Undersea Adv. Nicholl's Town Andros	Neal Watson	2	40'/30 Divers 28'/16 Divers	70	Andros Beach Hotel Andros Beach Villas	13 10	Andros Undersea Adventures P.O. Box 4960 Ft. Lauderdale, FL 33304	(800) 327-8150† (305) 564-8633	Full Service Dive Resort Hotel
Bahama Divers Ltd. Nassau New Providence Island	Frank Watson	6	42'/25 Divers 42'/25 Divers	40	Ambassador Beach Brittania Towers Holiday Inn	400 600 533	Bahama Divers Ltd. P.O. Box N-5004 Nassau, Bahamas	(809) 322-8431 (809) 323-2644	Tourist Diving & Snorkeling
Bimini Undersea Adv. Brown's Marina Dock North Bimini	Neal Watson	3	28'/20 Divers 40'/24 Divers 40'/30 Divers	180	Big Game Fishing Club Blue Water Inn Brown's Hotel	51 20 28	Bimini Undersea Adventures P.O. Box 4960 Ft. Lauderdale, FL 33338	(800) 327-8150† (305) 564-8633	Independent Dive Operator
Carib Divers Paradise Island New Providence Island	Tyrone Whymms	3	36'/20 Divers	22	Loew's Harbour Cove	250	Carib Divers P.O. Box SS-5062 Nassau, Bahamas	(809) 326-2561	Combination Tourist & Experi- enced Diving Svcs.
Chub Cay Club Chub Cay Berry Islands	Dick Yax	2	36'/24 Divers 36'/24 Divers	80	Chub Cay Club	55	AT Reef Ventures 292 S.W. 34th Street Ft. Lauderdale, FL 33315	(800) 327-7333† (305) 524-0106	Combination Tourist & Experi- enced Diving Svcs.
Coral Harbour Divers Nassau New Providence Island	Stuart & Tula Cove	3	40'/14 Divers 30'/10 Divers	80	Casuarinas Apts.	36	Compass Dive Tours 2022 Powers Ferry Rd. #230 Atlanta, GA 30339	(800) 241-6573	Combination Tourist & Experi- enced Diving Svcs.
Dive Abaco Marsh Harbour Abaco	Skeet LaChance	1	44'/12 Divers 30'/8 Divers	75	Great Abaco Beach Hotel Lofly Fig Villas	25	AT Reef Ventures 292 S.W. 34th St. Ft. Lauderdale, FL 33315	(800) 327-7333† (305) 524-0106 (809) 367-2014	Independent Dive Operator
Elbow Cay Club Hope Town Abaco	Michael Maltarp	1	38'/10 Divers	24	Elbow Cay Beach Inn	30	Elbow Cay Beach Inn Hope Town Abaco, Bahamas	(800) 327-0787† (809) 367-2748	No Instruction No Rentals
Exuma Divers Ltd. George Town Exuma	Wendel McGregor	2	23'/8 Divers 38'/18 Divers	36	Peace & Plenty Out Island Inn	32 80	Exuma Divers Ltd. George Town Exuma, Bahamas	(809) 336-2030	Combination Tourist & Experi- enced Diving Svcs.
Island Marine Parrot Cay, Hope Town Abaco	Dave Gale	2	25'/8 Divers 20'/6 Divers	30	Abaco Inn	10	Island Marine Parrot Cay Abaco, Bahamas	(809) 367-2822	Combination Tourist & Experi- enced Diving Svcs.
Jack Tar Village West End Grand Bahama Island	Nigel Froome	1	28'/4 Divers	20	Jack Tar Village	537	Jack Tar Village 403 South Akard Dallas, TX 75202	(800) 527-9299† (809) 346-6211	Tourist Diving & Snorkeling
Nassau Dive Supply Nassau New Providence Island	Frances Young	6	23'/8 Divers	40	Pilot House Hotel	125	Nassau Dive Supply P.O. Box N-1658 Nassau, Bahamas	(809) 322-4869	Full Service Dive Shop
Pittstown Point Landing Crooked Island	Clinton Scavella	2	19'/5 Divers 18'/4 Divers 16'/3 Divers	15	Pittstown Point Inn	12	Bahamas Caribbean Int'l. P.O. Box 9831 Mobile, AL 36691	(205) 666-4482	Limited Diving for hotel guests only
Romora Bay Club Harbour Island North Eleuthera	Roy Schmidt	3	25'/10 Divers 25'/10 Divers 31'/20 Divers	90	Romora Bay Club	32	Romora Bay Club P.O. Box 2617 Stuart, FL 33495	(800) 327-8286† (305) 287-8293	Combination Tourist & Experi- enced Diving Svcs.
Rum Cay Diving Club Rum Cay	Bob Keller	7	34'/20 Divers 34'/20 Divers 34'/20 Divers	250	Rum Cay Diving Club	17	Rum Cay Diving Club 701 S.W. 48th Street Ft. Lauderdale, FL 33315	(305) 467-8355	Full Service Dive Resort Hotel
Small Hope Bay Lodge Andros Town Andros	The Birches	7	34'/24 Divers 31'/15 Divers 28'/15 Divers	60	Small Hope Bay Lodge	20	Small Hope Bay Lodge P.O. Box N-1131 Nassau, Bahamas	(800) 327-3139† (305) 443-3821 (809) 328-2014	Full Service Dive Resort Hotel
Smuggler's Rest Coral Harbour New Providence Island	Ray & Lyn Post	2	35'/18 Divers 28'/12 Divers 19'/4 Divers	54	Smuggler's Rest	7	Smuggler's Rest Box N-8050 Nassau, Bahamas	(800) 328-8029 (809) 326-1143	Full Service Dive Resort Hotel
South Ocean Divers Lyford Cay New Providence Island	Rudy Turnquest	2	44'/25 Divers	54	So. Ocean Beach Hotel	120	South Ocean Divers P.O. Box N-6191 Nassau, Bahamas	(809) 326-4397	Combination Tourist & Experi- enced Diving Svcs.
Spanish Wells Resorts Spanish Wells North Eleuthera	Lill Campbell	7	34'/18 Divers 34'/18 Divers 28'/15 Divers 25'/6 Divers	250	Spanish Wells Beach Resort Spanish Wells Harbour Club	29 21	AT Reef Ventures 292 S.W. 34th St. Ft. Lauderdale, FL 33315	(800) 327-7333† (305) 524-0106	Full Service Dive Resort Hotel
Staniel Cay Divers Staniel Cay Exuma	Bill Crawford	2	26'/8 Divers 50'/25 Divers	35	Staniel Cay Yacht Club Happy People Marina	6 11	Transmar International 1640 S.E. 7th Street Ft. Lauderdale, FL 33316	(800) 327-3011† (305) 467-6850	Independent Dive Operator Facility
Stella Maris Inn Stella Maris Long Island	Jorg Friese Peter Kuska	5	32'/15 Divers 28'/10 Divers 65'/30 Divers	100	Stella Maris Inn	42	Stella Maris Inn P.O. Box 105 Long Island, Bahamas	(800) 327-0787† (305) 467-0466 (809) 336-2106	Full Service Dive Resort Hotel
Sun Divers Ltd. Nassau New Providence Island	Lambert Albury	4	25'/16 Divers 28'/19 Divers	35	Sheraton British Colonial	325	Sun Divers Ltd. P.O. Box N-10728 Nassau, Bahamas	(809) 322-3301	Combination Tourist & Experi- enced Diving Svcs.
Treasure Cay Diving Ctr. Treasure Cay Abaco	Joel Pratt	2	30'/18 Divers	55	Treasure Cay Hotel	122	Treasure Cay Services 2801 Ponce de Leon Coral Gables, FL 33134	(305) 444-8381 (809) 367-2570 (800) 327-3714†	Combination Tourist & Experi- enced Diving Svcs.
Underwater Explorers Society Freeport Grand Bahama Island	John Englander	10	42'/24 Divers 30'/12 Divers 40'/28 Divers	120	Lucayan Bay Hotel Holiday Inn Atlantik Beach Hotel	165 490 175	Underwater Explorers Society P.O. Box F-2433 Freeport, Bahamas	(809) 373-1244	Independent Dive Operator Facility
Underwater Tours Ltd. Nassau New Providence Island	Gardner Young	5	65'/50 Divers 23'/6 Divers 26'/8 Divers	60	Pilot House	125	Underwater Tours Ltd. P.O. Box N-1658 Nassau, Bahamas	(809) 322-3285	Tourist Diving & Snorkeling Svcs.
Valentine's Yacht Club Harbour Island North Eleuthera	John Valentine	2	38'/30 Divers 36'/20 Divers 36'/20 Divers	100	Valentine's Yacht Club	21	Valentine's Yacht Club Harbour Island North Eleuthera, Bahamas	(809) 333-2142	Combination Tourist & Experi- enced Diving Svcs.
Walker's Cay Dive Shop Walker's Cay Abaco	Cheryl Kirz	2	36'/24 Divers 22'/6 Divers	60	Walker's Cay Hotel	62	Walker's Cay Hotel 700 S.W. 34th Street Ft. Lauderdale, FL 33315	(800) 327-3714† (305) 523-4300	Combination Tourist & Experi- enced Diving Svcs.
Winding Bay Dive Center Rock Sound Eleuthera	John Kohnle	2	28'/10 Divers	15	Winding Bay Beach Resort	36	Winding Bay Beach Resort P.O. Box 93, Rock Sound Eleuthera, Bahamas	(809) 334-2019	Tourist Diving & Snorkeling

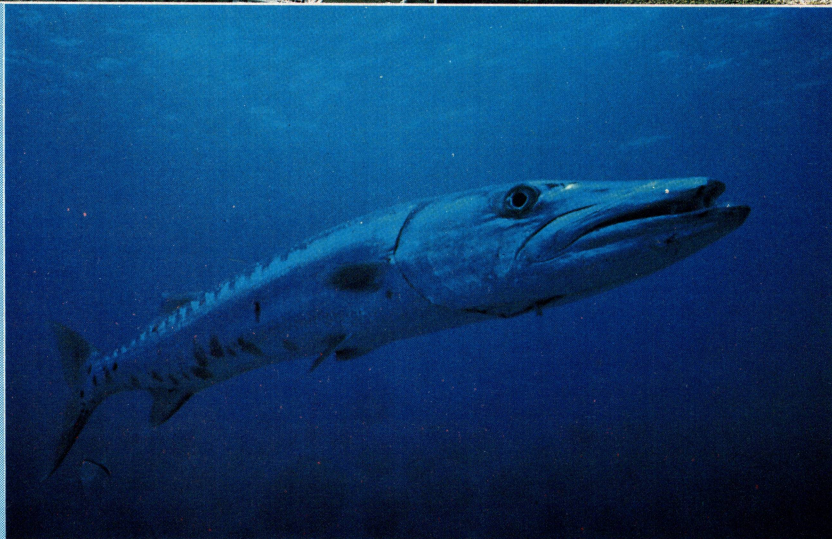
BAHAMAS

same information in its logbook. A day of diving is defined as a day in which any paid scuba or snorkeling activity is done under the auspices of an operation which is a participating member of the Bahamas Diving Association. Each day of diving recorded and verified in the passport earns credits toward a free diving vacation.

The Bahamas Diving Passport automatically enrolls you in the Awards Program. The awards range from a free day of diving up to a free diving vacation for two, including: 14 days of diving at your choice of resorts; 14 nights accommodations; breakfast and dinner and unlimited travel within the Bahamas for 14 days on Bahamasair. The awards are based upon the number of days you dive in the Bahamas and the number of diving destinations you visit in a three year period.

For more information about the diving passport program, and to obtain an application form for your passport, contact: Bahamas Tourist Office, 255 Alhambra Circle, Suite 415, Coral Gables, FL 33134; U.S. toll free (800) 327-7678. ✈

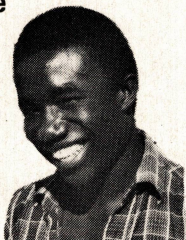
Stella Maris is a full service, out-island resort with exciting dive sites such as Barracuda Heads and spectacular Shark Reef.



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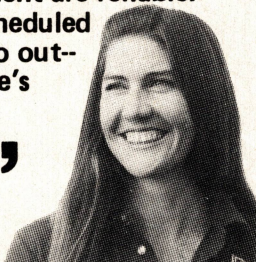
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WHY DIVE GRAND BAHAMA? Reason No. 6

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GINA CHENOWETH
UNEXSO Instructor



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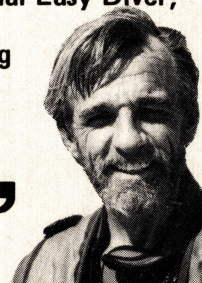
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WHY DIVE GRAND BAHAMA? Reason No. 10

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LOU FEAD
UNEXSO Chief Instructor
Author of "Easy Diver"



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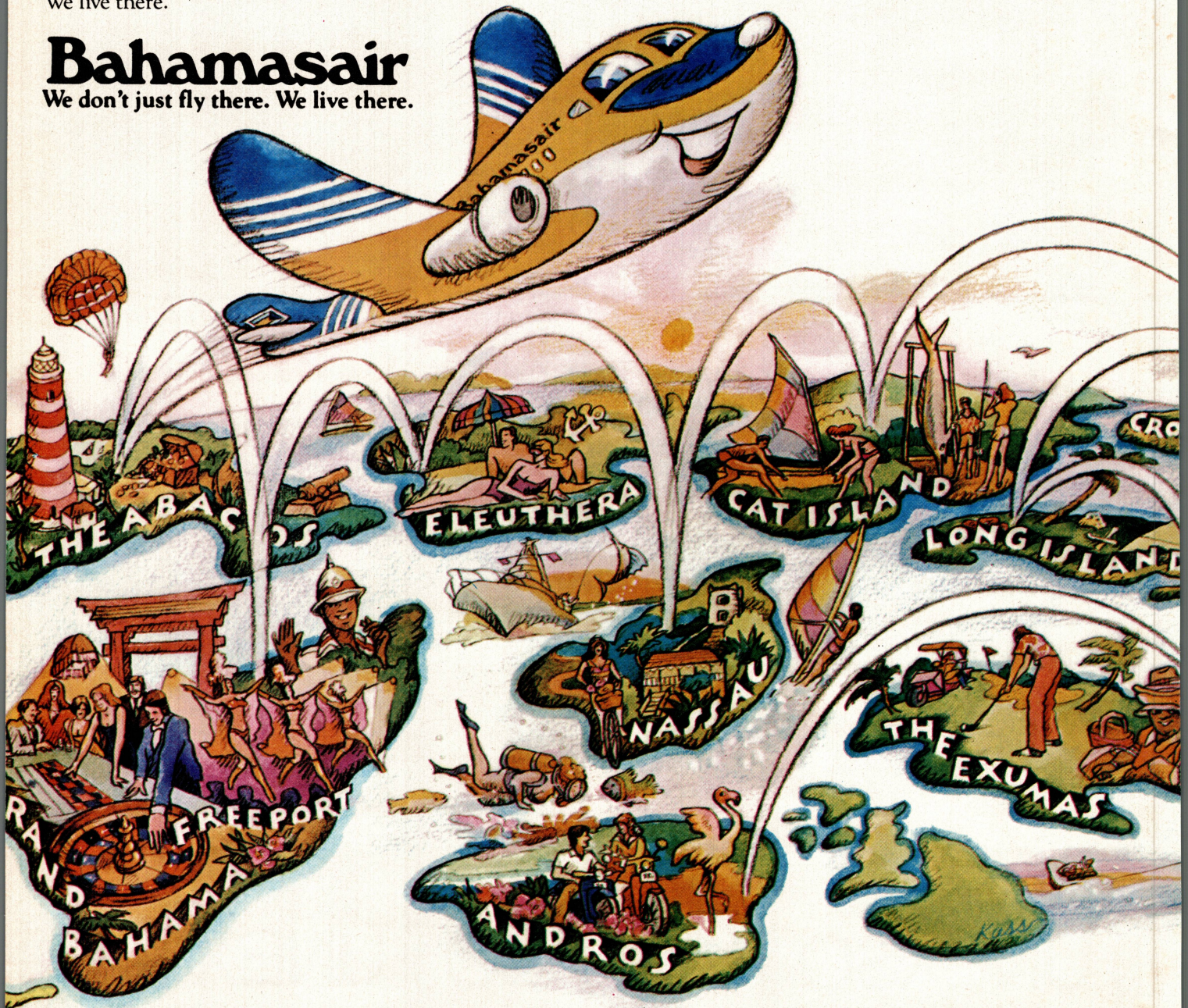
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Go Family Island hopping with a member of the family.

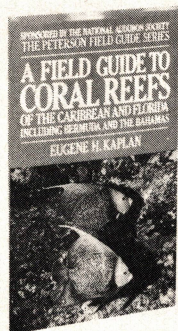
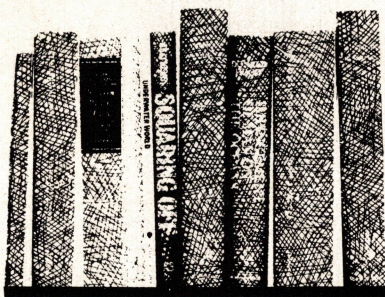
**Bahamasair wants you to come meet the entire family —
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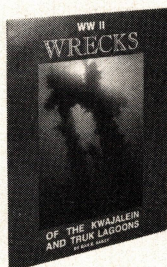
Bahamasair
We don't just fly there. We live there.



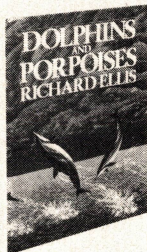
New Books



1 A Field Guide to Coral Reefs of the Caribbean and Florida—By Eugene H. Kaplan, the guide covers over 500 species of marine animals and plants. Over 400 illustrations, including 113 color photos, with species descriptions and discussion of reef structure and ecology. \$17.95. Houghton Mifflin.



2 WW II Wrecks of the Kwajalein and Truk Lagoons—By Dan E. Bailey, the book gives the history of the attacks on, and descriptions of, the ships sunk in these areas. Many U/W and war photos plus maps, diagrams and drawings. \$15.95. N. Valley Diver Pub., Suite 166, Box 6007, Redding, CA 96099.



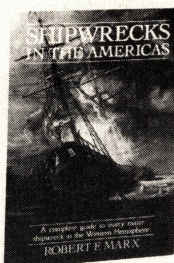
3 Dolphins and Porpoises—Written by Richard Ellis, and containing many reproductions of his paintings, this book describes 43 species of dolphins—their sizes, shapes, coloration, habits and distribution. Historical notes and anecdotes are included. \$25. Published by Alfred A. Knopf, Incorporated, NY.



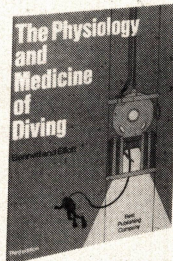
4 Dive to Adventure—U/W photographer/filmmaker Jack McKenney's book includes many photos that enhance such topics as: The Early Days, Many Sharks I Have Known, The Devilfish of El Bajo and The *Andrea Doria*. \$14.95. Sarijack Productions, P.O. Box 6365, Glendale, CA 91205-0365.



5 Swim Free—On waterproof paper, by Lorraine Eberhardt and Laura Sanborn, and illustrated by Shari Jones, this book is a program of aquatic exercises adapted from aquatic life forms. Each has biological notes on the featured animal. \$6.95. Search Pub., 2000 Old Stage Rd., Florissant, CO 80816.



6 Shipwrecks in the Americas—With more than 100 illustrations, this book by treasure hunter Robert F. Marx is described as a complete guide to major shipwrecks in the western hemisphere from the time of Columbus to about 1825. \$11.95. Crown Pub., 34 Engelhard Ave., Avenel, NJ 07001.



7 The Physiology and Medicine of Diving—Every chapter in this third edition has been rewritten and several new topics introduced. Subjects by a variety of experts include such topics as liquid breathing and artificial gills. \$56 plus \$3 postage and handling. Best Pub., P.O. Box 1978, San Pedro, CA 90732.

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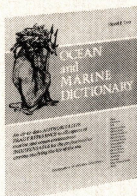
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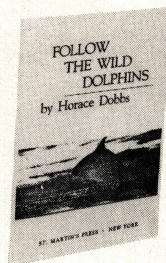
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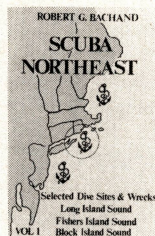
8 Ocean and Marine Dictionary— By David F. Tver, this dictionary is a reference to aspects of ocean life, above and below the surface. Scientific and lay terms are covered, from the history of ships to marine animals. Statistical tables included. \$18.50 plus \$3.50 shipping and handling. Best Pub.



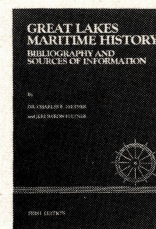
9 Field Guide to the Gray Whale— This guide, from the Oceanic Society, describes pertinent whale watching facts including: whale evolution, comparison of species and the whale watching sites on the Pacific Coast. \$3.95 plus \$1 handling. Legacy Publishing, 1850 Union St., 499, San Francisco, CA 94123.



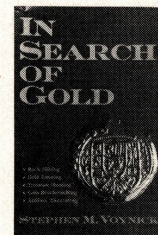
10 Follow the Wild Dolphins— Written by Dr. Horace Dobbs, this book discusses many interactions between humans and a dolphin named Donald off Isle of Man. The author describes his thoughts on how dolphins may view man. \$15.95. St. Martin's Press, 175 Fifth Avenue, New York, NY 10010.



11 Scuba Northeast— Written by Robert G. Bachand, Vol. 1 covers dive sites and wrecks of Long Island Sound, Fishers Island Sound and Block Island Sound. Topics include: tides, currents and marine animals. Includes chart reproductions. \$6.95. Rowe Pub., 3906 N. 69th St., Milwaukee, WI 53216.



12 Great Lakes Maritime History— By Dr. Charles E., and Jeri Baron Feltner, this reference lists over 1000 sources for information on subjects including lake and ship histories, shipbuilding, charts and photo collections. \$9.95 plus shipping. Seajay Publications, P.O. Box 2176, Dearborn, Michigan 48123.



13 In Search of Gold— Stephen M. Voynick's book delves into the history of man's search for gold and covers how to find it including prospecting and coin hunting. Ethics and legalities of recovering archaeological artifacts are also discussed. \$15.95. Paladin Press, P.O. Box 1307, Boulder, CO 80306.

(Continued on Page 116)



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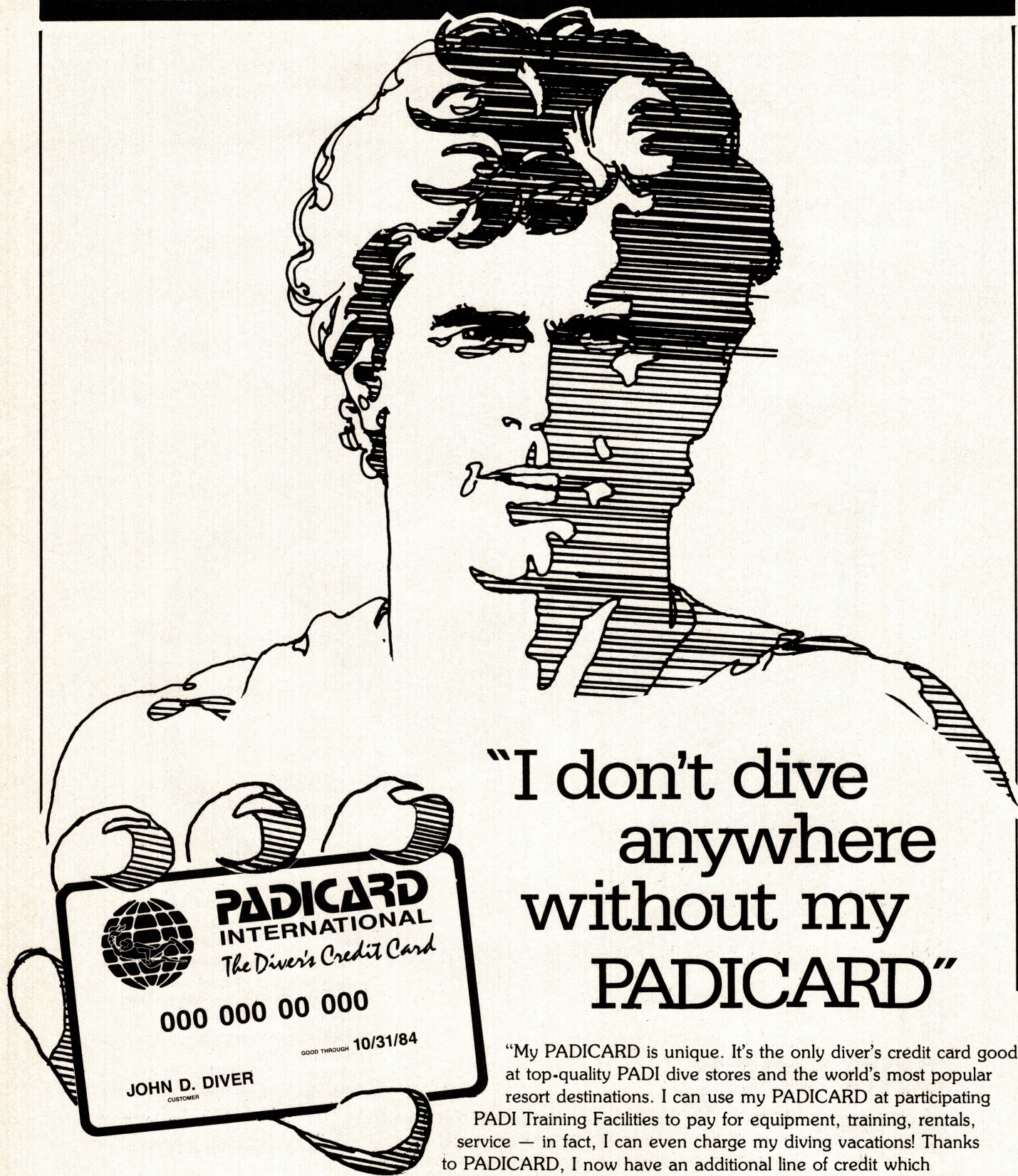
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SECTION

THE CAYMAN ISLANDER

Hotel With The Personal Touch

BY CAROL WINKER

"This little island is my home and I love it," says Suzie Powell, "so I want visitors to love it, too. If they don't leave my shop smiling, I think I haven't done my job."

Suzie works at Bob Soto's Diving Ltd. retail outlet at the Cayman Islander Hotel on Grand Cayman. She can book you a dive trip, sell you a depth gauge, recommend restaurants that serve anything from pizza to turtle steak and fill you in on local gossip.

Bob Soto's divemasters may be experts on the water and under, but come topside and Suzie knows more than all of them put together. She should. Born on Cayman's North Side, raised in the tiny village of Breakers on the south coast, now living and working near Seven Mile Beach on the west side of the island, Suzie has family or friends in every district. All of Grand Cayman is her domain.

And, she promotes it proudly from her high stool behind the shop counter, or from a lounge chair around the pool where she likes to sit and chat with hotel guests—much to the chagrin of Bob Soto's Diving management, who hesitate to leave the shop untended. But Suzie puts a sign on the door telling folks to come back to the pool. There's never any trouble finding her—just listen for the most animated conversation, the most bubbly laughter and there you'll find Suzie.

Besides, everyone at the hotel



photos/Geri Murphy



knows her almost as well as she knows them. The Cayman Islander is relatively small, just 67 rooms, with a staff of between 30-35 people. The hotel opened a little more than four years ago and has expanded since. Employees take pride in keeping the original rooms as neat and attractive as the new ones.

"I feel comfortable here and I think guests do, too," Suzie says. "Everything is out in the open." Literally. There's a poolside bar and cafe that divers especially appreciate: Food is served from 7:30 am until midnight. So, no matter how early you leave for a dive or how late you get back, you know you can get a good meal. And, when the local bands perform, it's music and dancing under the stars.

Working with Bob Soto's for over a year and a half, Suzie has met divers from all over the world, but refuses to label people from any country or region as being easier or more difficult

to deal with. "Some folks are so uptight when they get here, I figure it's just the pressures of what they've left behind. Give them a couple of days, get them in the water once or twice and they mellow out," she observes.

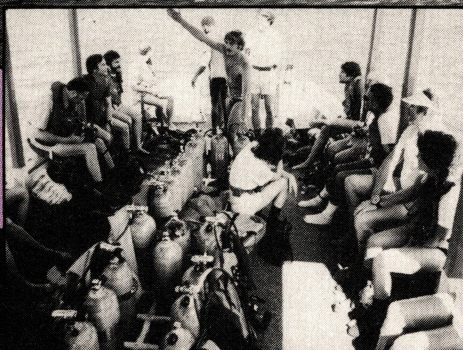
Contact with her has got to be part of the mellowing process. Divers who come with a group are surprised when she calls each of them by name the second time she sees them. Divers who come alone leave feeling like part of a family.

For Suzie, providing the extra personal touch is not going out of her way, it's just making her day more interesting. So, if a couple miss their transportation to the dive boat, she'll drive them over in her own car. If she doesn't have a needed object in stock, she'll either get it or tell the customer which shop does have it, exactly where it's located, the names of the owner and clerks, and probably what they'll be wearing.

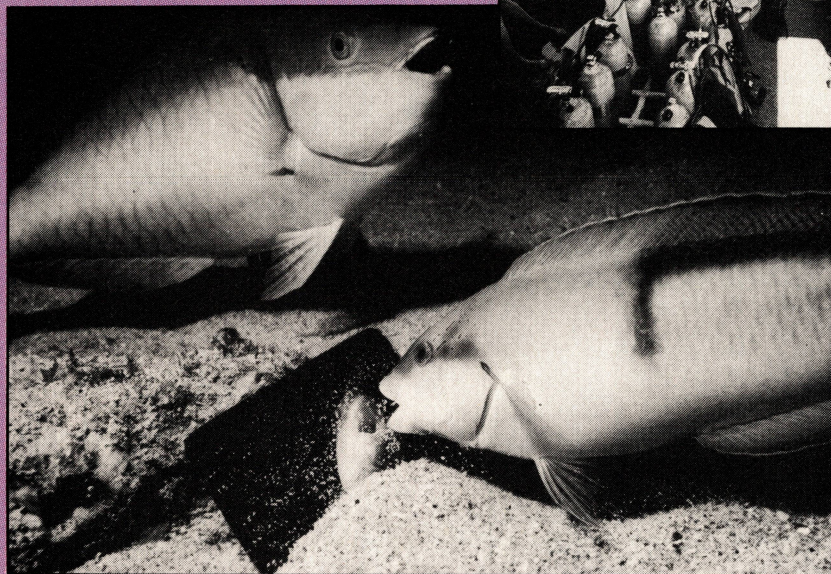
travel

"I'm just a people person," Suzie explains, "and divers are special people. They're like little kids sometimes, so excited when they come back from an especially good dive, so eager to have a good time."

Divers who stay at the Cayman Islander have a bonus package that includes morning two tank dives and unlimited shore diving. Transportation to the boats is provided for both the morning and night dives, almost always less than five minutes away. All of Bob Soto's boats are custom-built vessels with drop-fronts for easy access. They are equipped with VHF radio, first aid kits, oxygen, standby tanks and regulators, life rings and



photo/Carol Winker



photos/Geri Murphy

stern float lines. Dive sites are generally less than 15 minutes from shore, even the first morning dive which is usually along the spectacular wall: Big Tunnels, Orange Canyon or Trinity Caves, to name just a few. The second morning dive is on a shallow reef, perfect for photography, with the surface interval a relaxing time to learn about the various sites and meet the interesting people on board.

Night dives are usually to one of the wrecks in either George Town Harbour or along Seven Mile Beach, again, just minutes from shore.

Beginning this May, additional transportation will be scheduled several times daily from the hotel to Bob Soto's new Scuba Centre in George Town, just one mile away. This is a complete training and shore diving facility, with both Soto's Reef and Soto's Reef South easy swims.

Transportation from the Cayman Islander is included because the hotel is on the inland side of the road that fronts the beachside properties. But for people who get enough ocean by being in it, the Cayman Islander's location means a savings of around

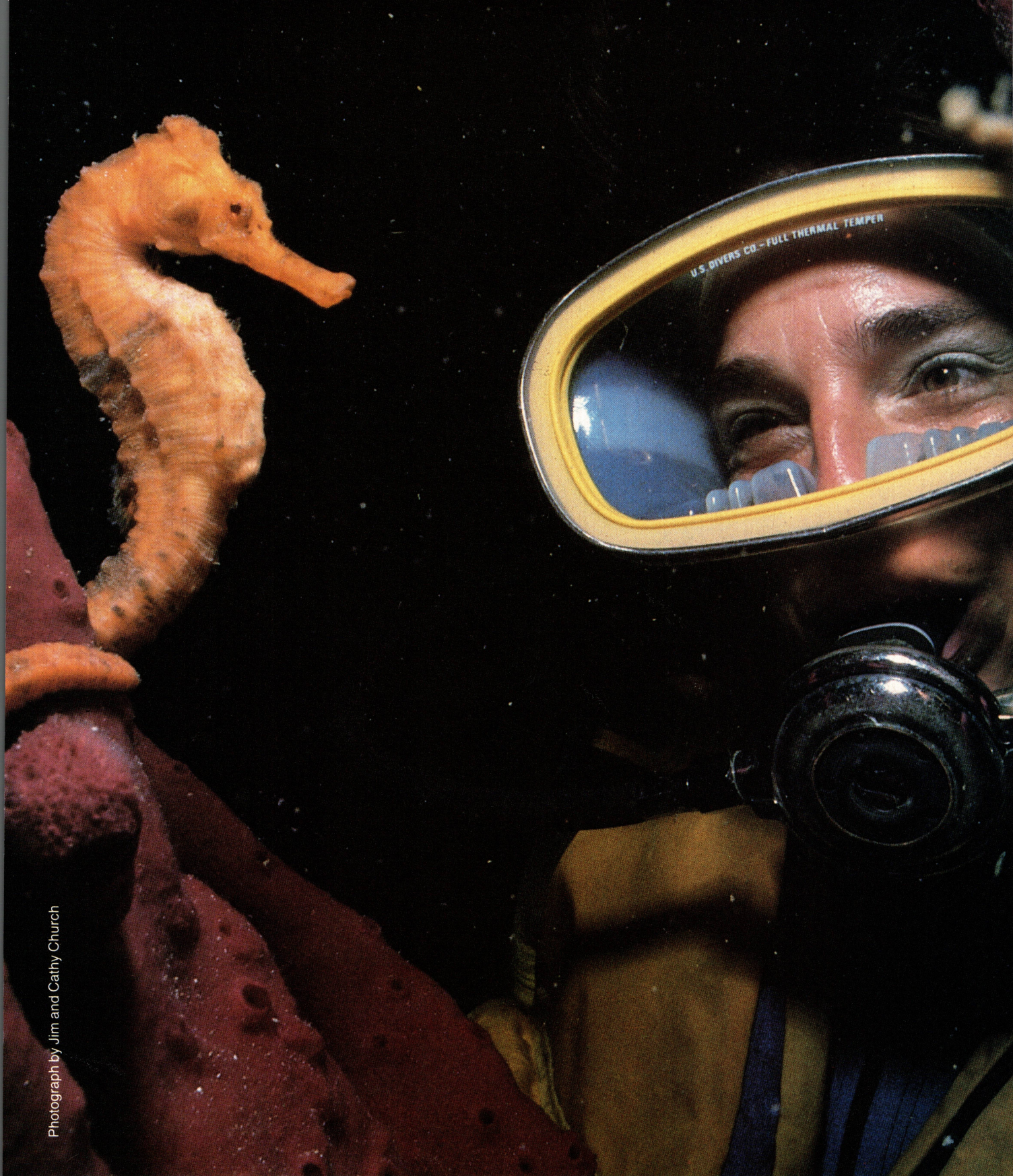
Suzie Powell personifies the friendly, personal touch that guests of the Cayman Islander and Bob Soto's receive.

\$100 a week for a room that's as good as any and better than many on the seaside.

Surveys show that divers who stay at the Cayman Islander are more likely to spend their afternoons either shore diving or touring the island on a rented moped rather than lying on the beach. But beach access is readily available: There is a walkway across from the hotel. Besides, beachside hotels welcome both residents and visitors.

At the end of the day, the Cayman Islander guests are likely to be heading back to their own hotel where they can look forward to meeting the many local people who have found it a pleasant place to stop after work; where Bob Soto's staff enjoys congregating in the evening; and where Suzie will be checking on her friends.

Resident manager George General estimates that in the winter divers make up 15 percent of his guests, a rate that rises to 80 percent in the summer. As more divers come to know Suzie and the kind of hospitality she personifies, both percentages are likely to go even higher. >



Photograph by Jim and Cathy Church

A fantastic variety of excellent dive sites by day. A fantastic variety of restaurants and clubs by night. For a copy of our 24-page Dive Guide, write: United States Virgin Islands Division of Tourism, P.O. Box 471269, Miami, FL 33152.

**“...the United States Virgin Islands
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FRINK COURSES

The schedule for underwater photo seminars with Stephen Frink has been released and includes both basic instruction at John Pennekamp Coral Reef Park and advanced instruction at Spanish Cove and Dive Bonaire.

The basic classes are three days and include both classroom and in-water sessions. These classes are limited to six people. The dates for the basic course are: May 28-30, June 12-14, July 17-19, August 14-16, April 24-26 (Ocean Reef Club, Key Largo).

The advanced classes are seven days and include wall diving, night diving and wreck dives, as well as shallow reef diving in order to teach wide angle, fish and macro photo techniques. The advanced class is limited to 12 participants and will include the use of underwater video as a diagnostic tool. The dates for the advanced course are: April 7-14 and September 8-15 at Spanish Cove; May 12-19 at Dive Bonaire.

Both basic and advanced classes include daily processing of Ektachrome films and projection critiques. For further information, please contact Stephen Frink Photographic, P.O. Box 19A, Key Largo, FL 33037, (305) 451-3737.

SPANISH COVE

Spanish Cove Resort on Grand Cayman has recently added 26 new rooms, including four suites, increasing the hotel's capacity to 100 people.

Spanish Cove's dive center can now accommodate 80 divers per boat trip owing to the addition of a new 38 foot mono hull. The new boat will make frequent trips to the North Wall and hence is named the *North Wall Diver*.

The Cove Boutique at the resort offers jewelry, swimwear, tropical attire, newspapers, sun lotions, shampoos, souvenirs, etc. It offers a weekly fashion show as well.

BONAIRE BEACH HOTEL

Caledonian Hotel management has been appointed to manage the Bonaire Beach Hotel, formerly the Hotel Bonaire. The new general manager is Neil Maitland-Walker. CHM's future plans include refurbishing of standard rooms, new landscaping, conversion of the saltwater pool to fresh water, opening a nightclub and enlarging the beachfront restaurant.

The new food and beverage manager, Kees Sekkes, will initiate a new divers' fast food program to include a hot meal buffet and a barbecue lunch.

ALM EXPANDS IN U.S.

ALM Antillean Airlines has realigned its U.S. sales network to better serve the

U.S. travel industry. U.S. sales areas are being increased to seven, from the present three, with sales personnel based in Miami, New York, Houston, Chicago, Atlanta and Detroit. Coincident with the expanded representation, U.S. sales headquarters is being relocated to Miami, ALM's primary line service gateway to the Dutch Caribbean. In addition, a service center has been established in Miami. The toll free number is (800) 327-7197; in Florida (800) 432-2849.

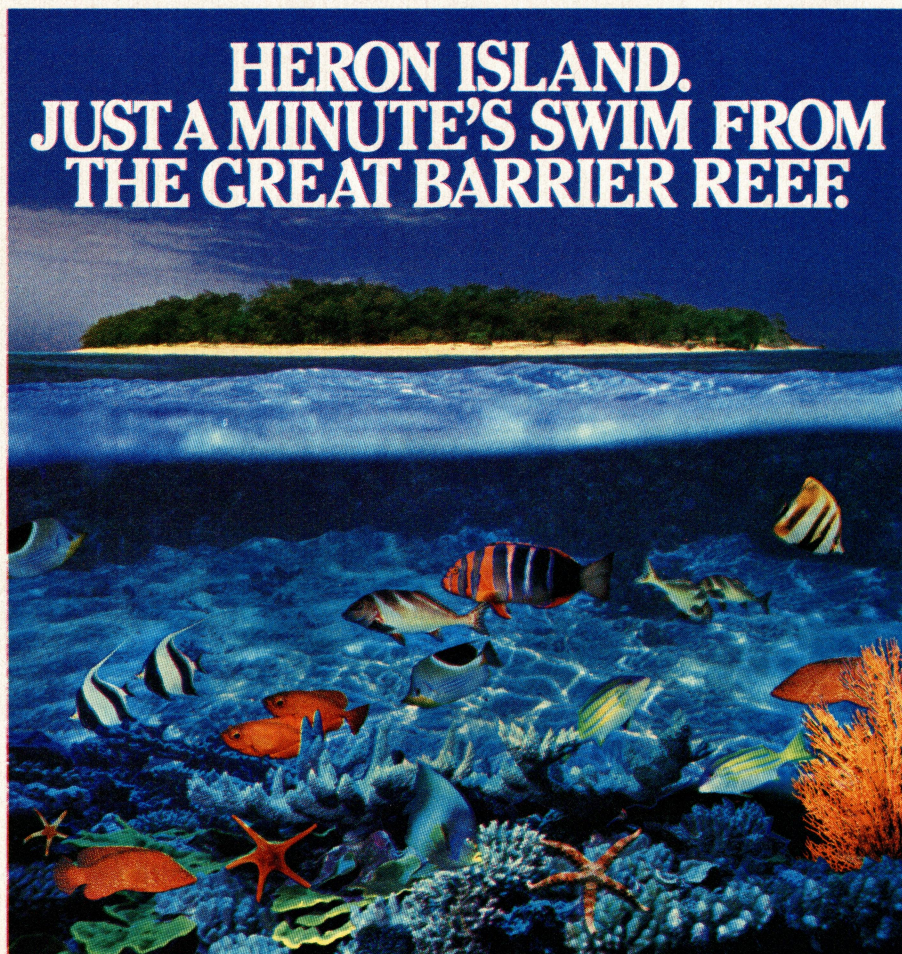
SANTA CERTIFIED

Santa Claus has successfully completed the PADI open water scuba course at Springfield Scuba Supply, Springfield, MA. When asked why he chose PADI, he replied "When you're as busy as Santa you need a course which is flexible and convenient, and of course, fun."

ANGUILLA

Anguilla, one of the newest diving spots in the Caribbean, is beginning to attract divers and clubs from all over the United States. The island has a variety of dive sites including a barrier reef system.

Tamariain Watersports, owned by Iain I. Grummitt, a PADI instructor who has been diving in the islands for many years, offers Anguilla diving on a 32 foot flattop or a 20 foot power boat. It also offers picnic trips to the offshore cays and islands and has various sailing boats for hire.



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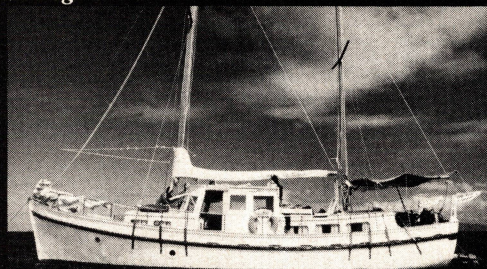
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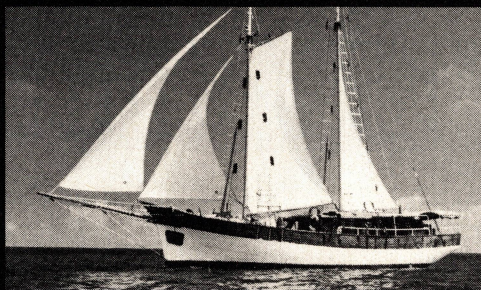
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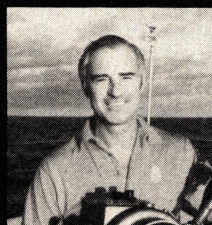
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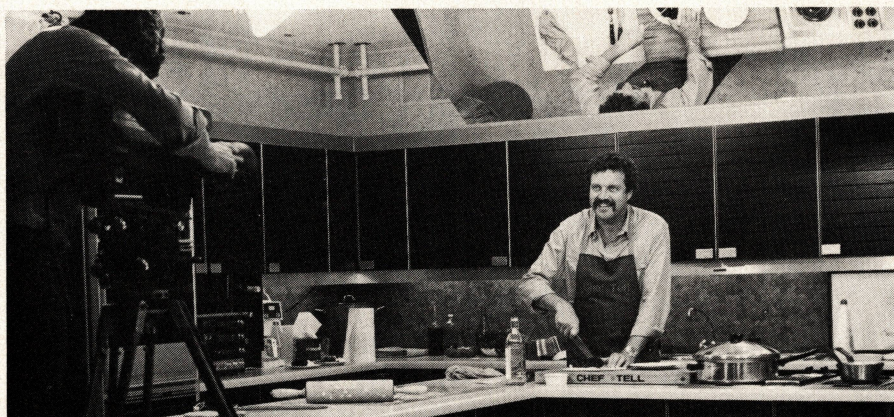
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CHEF TELL Fish Tips From TV

BY ELLSWORTH BOYD



photos courtesy Joe Goldshear

"Do you spearfish?" I asked. "No," the chef replied, speaking with a brisk German accent. "I do underwater photography."

"Then where do you get the fish for some of your popular seafood recipes?" I implored.

"What I do," the chef explains, "is go into a fish store, buy 10 pounds of snapper and tell the guy to wrap them up. Then I say, 'Throw them to me!'"

"The guy says, 'Why should I throw them to you?' And I say, so I can tell my friends I caught them!"

His cooking is much better than his jokes, but chef Tell Erhardt continues to delight his audiences with down-home humor and uncomplicated recipes on Westinghouse Group W's PM/Evening

Magazine. The nationally syndicated show, to which the chef contributes a 90 second segment twice a week, is televised in 100 cities throughout the U.S.

Tell is noted for "telling it like it is" in a fast-paced lesson that takes the fear out and puts the fun back into cooking. He runs the gamut from Scotch barley soup to baked stuffed fish, braised beef, barbecued chicken, German apple cake and hundreds of other recipes geared to simplicity and comfort in the kitchen. Erhardt's segment of the show is filmed in his combination office and studio in Ambler, Pennsylvania, a suburb of Philadelphia. That's where he also keeps many charts of Caribbean dive sites and some of his dive gear. If dive enthusiasts view Tell's show with a keen eye, they might

spot the Rolex on his wrist, conspicuous on the close-ups and telltale evidence of the chef's second love.

"When I'm not cooking, I'm underwater," the chef smiles, "chasing fish with my camera. That's where I relax and get away from all the TV lights."

Although he has been a champion biker, a skydiver and an auto racer, Erhardt's passion for diving has continued for more than 20 years. He first became interested in the sport in 1962 while visiting Greece and watching divers in the Aegean Sea.

"I asked about instruction," Tell smiles, "and they gave me a tank and a mask, told me to go down, come up and if there was no blood in my mask after the dive, I was certified!"

Cayman Islands

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EXTRA NIGHT

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**DLX- Deluxe

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After more professional training, he took trips periodically to dive the Red Sea off Egypt and off Spain and Italy in the Mediterranean. The chef came to the United States in 1973 and obtained advanced diver certification through NAUI at Temple University. Erhardt is pleased with American certification which he describes as, "security, security—safe, safe, safe." Although Grand Cayman is his favorite dive spot, he has explored reefs off Cozumel, the French West Indies and the Florida Keys and hopes to dive the Great Barrier Reef off Australia on a combination business-pleasure trip.

The tall, cordial chef, with an engaging grin and boyish charm, was not always an underwater photographer. "When I first dove in the Caymans," he says, "I spied a huge lobster on a shallow reef not far offshore. I chased him in a one-on-one battle around the coral heads and I won. I caught him bare-handed, a 15 pounder! That's a big bug, real big and I was so proud of my catch.

"But when I brought it ashore, the resort owner made me take it back! He doesn't allow divers to take anything out of the water and I wasn't about to fight with him over a lobster. So I took it back and switched to a camera. Photography is nicer and it doesn't upset reef ecology.

"I had another unusual experience in the Caymans," the chef recounts. "It was on my second dive in this country, with Dr. Lynch and Dr. Leahy from Temple University. They took me down to feed Waldo, the tame moray eel. When we arrived at Waldo's cave, Dr. Leahy banged on his tank with a knife and Waldo was supposed to come out. But nothing happened. He banged again and all of a sudden I felt a rush of water around me. Waldo was already out and when he heard the noise he returned home. Suddenly I saw this six foot moray sliding between my legs! I thought to myself, 'one move and that's it!' But Waldo just swam into his cave and looked back at us."

Can America's popular chef, whom some viewers dub, "the Phil Donahue of cooking," compare diving to cooking?

"Of course," the chef says. "To begin with, it takes a lot of guts to do both! In diving and cooking you need patience and you have to wait until you are ready. If you rush you'll have an accident. You must check your gear in diving and you must do the same with all the equipment you use in the kitchen.

"Training is important in both. You are trained to cook and you are trained to dive—you must know what you are doing at all times. This leads to preparation. You can't just go to the stove and start cooking and you can't just jump in the water and scuba dive. It scares me when I think about the first time I went diving. In the kitchen you prepare your ingredients and utensils and in diving you prepare your schedule and equipment.

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CHEF TELL

"On the first dive there is always a little anxiety, especially if you haven't been in the water for awhile. But on the next dive you feel more relaxed and you become a part of the sea. One diver compares it to being in his mother's womb again—secure in a silent world. That's a nice philosophy. A cook may have some anxieties too, particularly when returning to the kitchen after a leave of absence. Again there is a readjustment to the environment. A cook might be apprehensive while trying a new recipe, especially if it's being prepared for guests."

Chef Tell has prepared meals for many celebrity guests: Queen Elizabeth and Princess Margaret, Henry Fonda, Peter Ustinov, Yul Brenner, John Davidson, Mike Douglas, Dinah Shore—the list goes on. He has written three cookbooks, his most famous one being, *Chef Tell's Quick Cuisine*, now in its second printing. Tell keeps no secrets and graciously offers people helpful hints on cooking. I asked for some special seafood hints for divers and he began with fish.

"Sometimes people tend to overdo it with fish," he says. "They get a piece of fish and put all kinds of junk on it like white wine, red wine, this sauce, that

sauce and pretty soon you can't taste the fish anymore. If you put oregano on it, you belch up oregano for six hours. The only time I cook fish with a fancy sauce is when it will be served as an appetizer. My advice is to keep it simple. Saute or broil your fresh snapper, grouper, bass, whatever, but don't overpower it with other flavors.

"Filet the fish, dredge it in flour, and saute it in butter or margarine. That's great—try it, you'll like it. In Greece, you choose a fish, they gut it and throw it on a hot stove plate and cook it with the scales on. Then they give you olive oil and lemon juice, you take off the scales and devour the fish. It's not a bad way to prepare it. People from Louisiana know what I mean—they do it.

"If you want a change of pace," the chef adds, "seafood gumbo is easy to fix—Louisiana style. Throw everything into the pot with some okra, peppers and onions and just cook it. You can use any fish such as snapper that falls apart or grouper that stays together. Don't take fish too seriously because it's a simple delicacy and its flavor must prevail."

What about worms in fish—can they be cut out? "Yes," Tell confirms, "if you see them, trim them out. If not, the worms will die when you cook the fish!"

The chef really enlightens divers about lobster tails. He likes the South African and South American shellfish and offers

a very helpful hint in preparing them. He explains that fishermen in these countries often leave the tails exposed to the sun for six to eight hours and this alters the meat, building up an iodine flavor. He suggests removing the meat from the shell and soaking it in milk for one hour before cooking. This expels the iodine flavor without modifying the flavor of the meat. If the fishermen in these countries would chill their catch immediately, like they do in Maine and other parts of the world, the iodine flavor would not emerge.

"Broiling lobster tails is fine," Tell says. "That's the American style, but if you want something fancy, make a sauce with leeks, carrots, shallots, a little brandy and white wine. Put the tails in boiling water for a few minutes, then take them out and allow to cool. Then cut each lobster tail in half, pound it on each side and remove the meat from the shell. Chop the meat into bite-size pieces and mix it in with the vegetables. Add a little more white wine and reduce it over the heat. Then put everything back into the shells and serve. This is a beautiful way to prepare lobster tails. It's a little bit involved, but especially good with South African or South American lobster."

When cooking with wine, the chef warns about using cooking wine because it contains salt and will cause an imbalance.

(Continued on Page 94)



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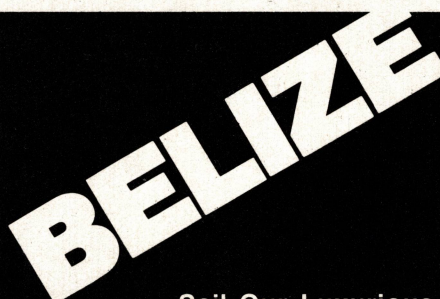
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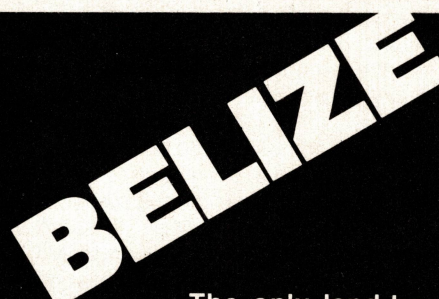
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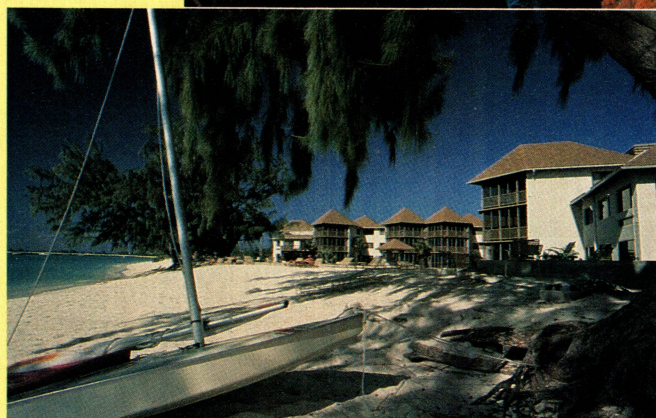
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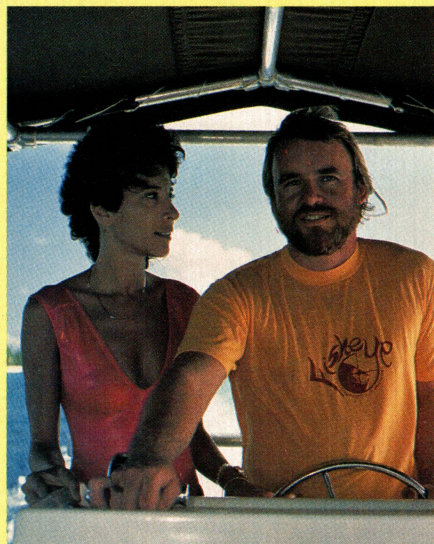


FISHEYE

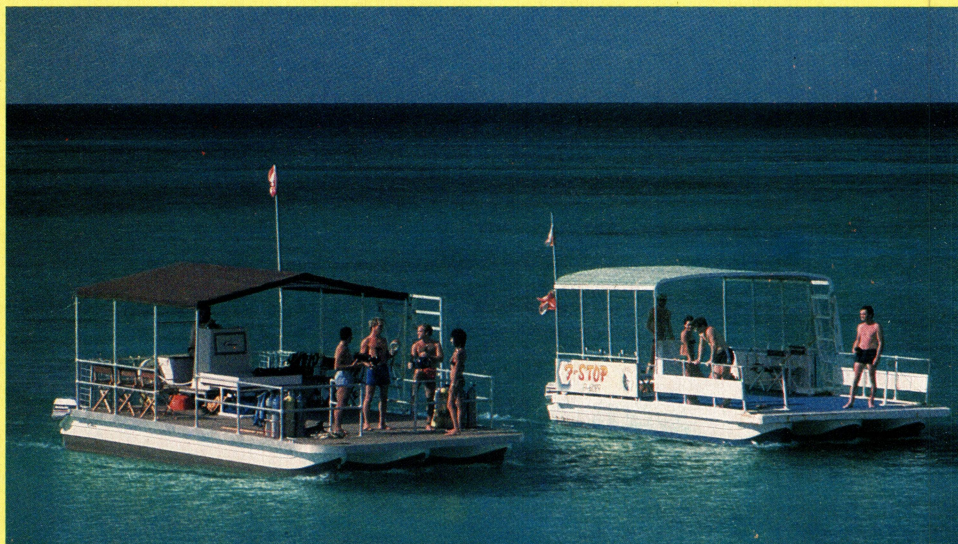
PHOTOGRAPHIC

Plantana Beach Condo, Grand Cayman.

Top: Ahuva Zaid swims over an elephant ear sponge.



Ahuva Zaid and Martin Sutton.



Fisheye Photographic's *F Stop* and *F Stop Too*.

As model Ahuva Zaid dropped into position behind the enormous orange elephant ear sponge it became quickly apparent these people were professionals. Her partner, Martin Sutton, gingerly positioned his photo student to capture the classic type of magazine shot that has become the trademark of these islands—the brilliance of the sponge, the proper positioning of a professional underwater model, the glow of the sun over her shoulder, and the particle free deep blue water. All these elements, along with the patient guidance of these underwater professionals, combined to allow the student to capture an image on one of his first underwater photo outings that otherwise could have taken months or perhaps years of personal trial and error.

As underwater photo instructors, Martin and Ahuva operate one of the best equipped and staffed underwater photo businesses in the Caribbean. Even though many resorts have an underwater photo center, Fisheye Photographic Services, at Trafalgar Place on Grand Cayman's Seven Mile Beach, is the only Caribbean dive resort operation that has established underwater photography as its exclusive goal. Although non-photo divers are welcome, every dive is designed first for the photographer.

The specialized needs and time required both in preparation and bottom time are considered on each dive. In-

come an accomplished and noted underwater photo team with an impressive number of magazine articles and photographs to their credit. With Martin serving primarily as photographer and Ahuva doubling as underwater model and photographer, they began a search for the most likely island in the Caribbean to establish the new Fisheye.

They chose Grand Cayman and have developed a modern shop just opposite the beach, which includes a dive operation with two comfortable flattop dive boats, the *F Stop* and *F Stop Too*. The newer boat, *F Stop Too*, was only recently delivered by Cobia and is equipped to handle groups of 15 with an excess of room and comfort. With both boats in operation Fisheye can handle groups of over twice that size, but Martin and Ahuva have elected to hold the maximum to 25 for the sake of creature comfort.

Fisheye has become the most complete underwater photo dive and instruction facility on Grand Cayman. The store offers the only computerized, four hour or overnight E-6 machine film processing on the island utilizing an Image Maker III with Kodak chemicals. The machine is capable of processing 35 mm or larger format films quickly with results equal to what you would expect from any quality photo lab. The availability of machine processed slides, instead of the more common hand-done sink processing, ensures consistent results.

Traveling dive photographers who find themselves without a necessary piece of equipment can look to Fisheye's expansive rental department with everything for the novice or professional production crew. From Nikonos III's with basic lenses, extension tubes or viewfinders to the exotic Nikonos 15 mm, almost every lens currently made for the Nikonos, and some that are not, are available. A variety of strobes from Ikelite and Helix for either close-up or wide angle can be rented and some are available for purchase. For snapshooters, the Sea & Sea 35 mm or 110 are also available. If you should want to try underwater video or are considering the purchase of an U/W video unit, Fisheye has one available to rent so you can sample the results before you make the purchase.

For photographers with strobe problems, Fisheye is the first Cayman Ikelite repair station, an idea that Martin developed and believes was long overdue. Repairs and a potentially lost photo vacation can usually be turned around quickly by a factory trained repair person.

In addition to film processing, Fisheye offers a wide array of special services including critique and consultation, custom title slides, dupes and darkroom services. As a working pro photographer Martin is available for special on site photo work with Ahuva available as underwater model to visiting photographers. The

shop also offers stock photo and print sales, all types of film, batteries and a limited supply of photo equipment at duty free prices.

The featured Fisheye service is the one-half day photo course and the more expansive three and six day detailed photo courses. With an air conditioned A/V equipped classroom, Martin limits the enrollment in these courses to a maximum of six. The half day class includes the use of all equipment, a roll of film with processing and one dive aboard one of the two boats. The course is taught every afternoon, 365 days a year and is designed to take the beginner through the basics. The intended result is to have the students capable of recording their dive with clear, colorful photos.

The longer courses take the student through more detailed photo work and include both wall and shallow water photo sessions with macro and wide angle equipment. Instruction includes not only classroom theory but open water work with Martin or one of his photo pros working by your side, helping you set up shots for maximum effect. The six day course includes sessions with Ahuva modeling and teaching how to work with an underwater model. During each class all necessary photo equipment and a portion of the film and processing are provided.

Fisheye's photo dive packages are available with or without instruction and include above average accommodations at a luxury condominium that includes central air conditioning, fully equipped kitchen, freshwater pool, maid service and laundry facilities. The entire photo dive concept is designed to pamper divers at no additional cost. Photographers typically board the boat beach-side of their condominium to find their tank, regulator and backpack ready. After a photo briefing on site the divemasters assist each person into dive gear and hand photo equipment over the side.

With all the services available, the prices of Fisheye's instruction and photo dive packages are remarkably low. In addition to two morning dives daily the packages include a free roll of film and processing, ten percent discount on photo purchases, evening slide shows, airport transfers, a surprise gift and all standard package features. Additional afternoon and night dives are available. You can get a complete brochure by writing: Fisheye Photographic Services, P.O. Box 2123, Grand Cayman, BWI. For answers to specific questions telephone: (809) 947-4209 or Telex CP 4336. For U.S. reservations only: (800) 526-1394.

As one of the most complete underwater photo services in the Caribbean, combined with Grand Cayman's diving, Martin and Ahuva offer diving photographers more than their money's worth. Fisheye could very well make you the underwater photographer you know you can be. 

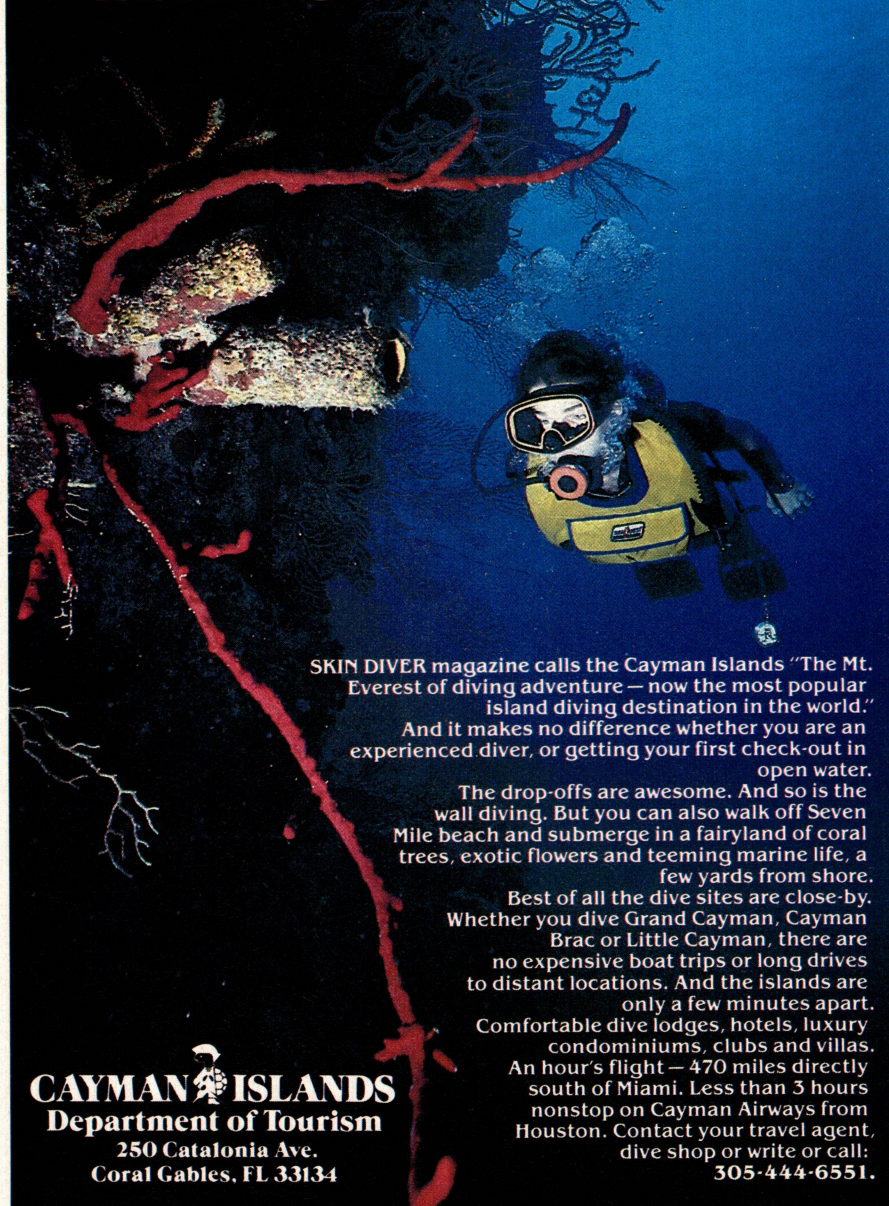
Cayman's totally dedicated U/W photography service

TEXT AND PHOTOGRAPHY BY STEVE LUCAS

stead of being led about the reef or wall in a group, Fisheye's photographer-divemasters swim directly to the best photo areas, usually in depths of less than 70 feet, then move out of the way. Their primary objective is to offer photo subject assistance, point out unusual photo opportunities, observe any problems, and remind preoccupied photographers of their bottom times. Prior to each dive the area is described in detail with emphasis on subjects of particular interest. Instead of having to spend air and bottom time searching, divers who have a personal subject interest are led directly to it and allowed to spend the entire dive working on only that one subject if desired.

The Fisheye complete underwater photo facility was originated by Martin while operating dive "seafaris" in the Red Sea. An Englishman, he taught Ahuva, a native Israeli, to dive and together they have be-

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CHEF TELL

(Continued from Page 90)

ance in the taste of the final product. He recommends a table wine instead. It's best to buy a few bottles and keep them on hand for cooking. They don't have to be expensive. House brands will do and they will keep well if refrigerated.

Tell offered another tip, this one on cooking shrimp on a charcoal grill. "When I cook on the grill," he says, "I leave the skin on the shrimp, put them on a skewer and squeeze a little lemon juice or sprinkle soy sauce on them. It doesn't take long to cook them. When they're done I take them off, let them cool, then peel them. They all stay nice and juicy with this method of cooking."

"If you want to cook the shrimp on the grill you must prepare the charcoal in a special manner. The charcoal should be on one side of the grill, not all over it. You put the shrimp over the coals and when the flame comes up, you move the shrimp to where there are no coals. There's as much heat here because it is radiant, but it doesn't burn the shrimp. Leave them on about eight minutes for average size shrimp. I do the same with fish unless it's the kind that falls apart—then I put it in foil over the radiant heat. You must be careful not to overcook fish or shrimp. Use your common sense. You can always put them back on the grill for another few minutes. But if they're overcooked, forget it."

Chef Tell is more than just a television star. His quick wit, combined with his ability to simplify the most difficult recipe, make him a most sought-after performer. He has achieved celebrity status, but continues to be warm, humorous and down-to-earth. Apart from the performer, Tell is a highly decorated master chef. Born in Stuttgart and trained in Baden-Baden and Heidelberg, he worked in France, Switzerland and Sweden, as well as his homeland. He was executive chef at the famed Kronen Hotel in the Black Forest for 12 years before coming here in 1973. At 27, Tell was the youngest man in Germany ever to achieve the title of master chef.

Joe Goldshear, Tell's business manager, says the chef receives several thousand fan letters a week. Joe says that Tell endorses various products, tapes commercials and conducts personal appearances in six to eight cities each month. Not all are for personal gain, however. He donates time to the Kidney Foundation and nursing homes to reciprocate some of the appreciation people heap upon him. His CB handle is Short Order One, and he signs off his TV show with, "I see you!" We'll see you too, chef Tell, on TV and underwater.

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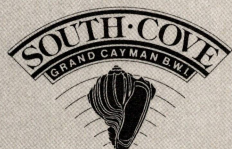
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In Gilchrist County there is also interesting snorkeling and diving in Sun Springs, Otter Springs, Hart Springs and Rock Bluff Springs, within 15 minutes of Aquaventure. Manatee Springs is just 20 minutes away, Crystal River, 45 and the Brandford area, 30 minutes away.

All divers are invited to contact the shop when planning a trip to the area or for any assistance.

KING CHRISTIAN TOLL-FREE

A new toll-free number, (800) 524-2102, was recently implemented at the King Christian Hotel, St. Croix, U.S. Virgin Islands.

This unique service makes it easier for visitors to directly place reservations with the hotel, as well as giving them an opportunity to ask questions and receive immediate answers about hotel accommodations, diving packages and the island.

U/W MENTAL HEALTH

The Underwater Mental Health Society will hold its conference, Mental Health at Depth, on St. Thomas, USVI April 25-30. Speakers include Drs. Peter Bennett, Theodore Blau, Richard Dunham and Patrick G. Bray. Topics will include Lure of the Deep: Indirect Suicidal Behavior; Personality Characteristics of Divers; Deep Diving to 2,250 feet; The Fearful Diver; Human Factors in Diving Accidents; and others.

Accreditation for psychiatrists, psychologists, social workers and nurses has been applied for. For more information contact the Underwater Mental Health Society, P.O. Box 11, Wenham, MA 01984; (617) 468-3866.

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SunDivers, Jamaica now offers Shawn McDermott's Underwater Photography School. This four day course offers PADI underwater speciality certification and all the diving takes place off Jamaica's North Coast, at Runaway Bay.

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Sea Shadows on St. Croix is continuing to expand its diving equipment and services. Currently the only NAUI pro facility on St. Croix, Sea Shadows has doubled its rental stock, expanded its retail sales and has the largest and fastest compressor on the island.

Sea Shadows offers a full range of certification programs from introductory to instructor. Sea Shadows will host the first NAUI instructor training course ever on St. Croix May 18-28. 🌿

BASKIN AIDS TURTLES

Baskin in the Sun of Haiti has instituted Save the Turtles, a program designed to save sea turtles from the nets of local fishermen.

On most Caribbean Islands, local fishermen routinely snag sea turtles in their nets and sell them along with the rest of their catch. The fishermen have no trouble selling these since turtle meat is considered a delicacy and a premium item on the island. Alan Baskin and Eva Cope,



operators of Baskin in the Sun, purchase turtles from the fishermen at higher than market prices and keep the turtles in water tanks until they can be safely released from the shore, away from the areas frequented by fishermen.

Members of Save the Turtles hope the creatures will be wiser about man and his fishing nets so that they can at least live long enough to lay eggs, thus reducing the threat of extinction.

The program has attracted the concern of local divers and businesses and over \$400 in contributions to date. 🌿

AQABA

A Diving Adventure Tour to Aqaba on the Red Sea is being offered by Alia, the Royal Jordanian Airline, in cooperation with the Aquamarina Club. The tour includes eight days hotel accommodations, full board, transfers, ten dives, taxes and service charges. Non-divers may attend at a reduced rate. Flights are available Wednesday through Sunday. For information call any Alia sales office. 🌿



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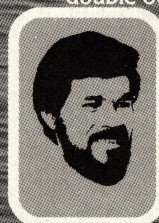
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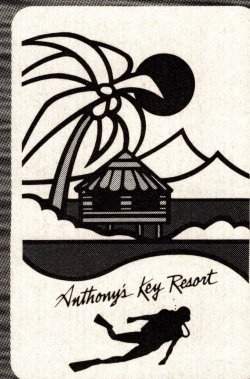
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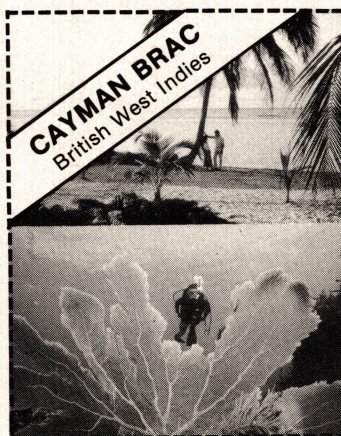


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Susie Powell



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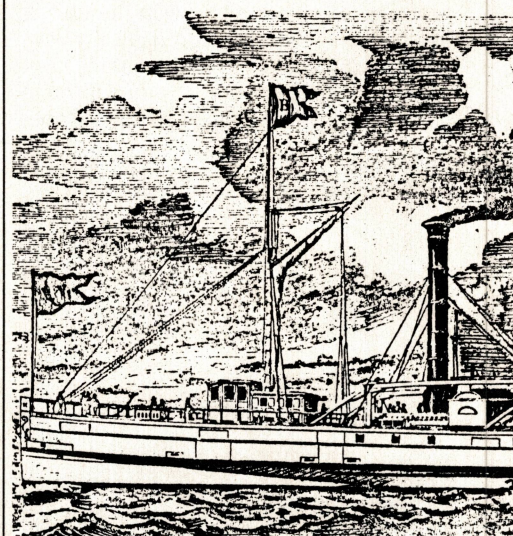
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SALVAGING THE BOSTON

BY HOWARD B. TOWER, JR.

During the final half of the Civil War, Union forces made several attempts to penetrate the inland defenses of Savannah and Charleston. Federal gunboats and troop ships steamed up the coastal rivers of the Low Country attacking Confederate fortifications and burning



plantations. In May 1864 Union commanders devised a plan to destroy the Charleston and Savannah Railroad, a vital link between these cities.

In essence, marines and soldiers would be transported up two adjacent rivers, the Ashepoo and South Edisto, land at predetermined points, then march inland and destroy rail bridges and track. Troop transports rendezvoused in St. Helens Sound on the morning of May 25.

Problems developed from the start. One vessel grounded on a bar and the *Boston* did not rendezvous as planned. The expedition commander, Brig. Gen. William Birney, decided to proceed up the Ashepoo in his flag ship *Plato* with another troop ship, the *Croton*. Their destination was Bennetts Point. Birney left the troop ship *Edwin Lewis* to wait for the *Boston* and guide her up river to Bennetts Point. The *Boston* reached St. Helens Sound at dusk.

The two vessels groped their way up the winding Ashepoo River in the darkness. A blackout was in effect. Captain Hancock of the *Lewis* did his best to navigate the treacherous river by starlight. He had grave doubts about the wisdom of

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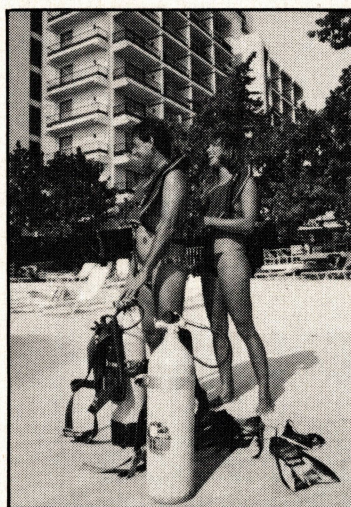
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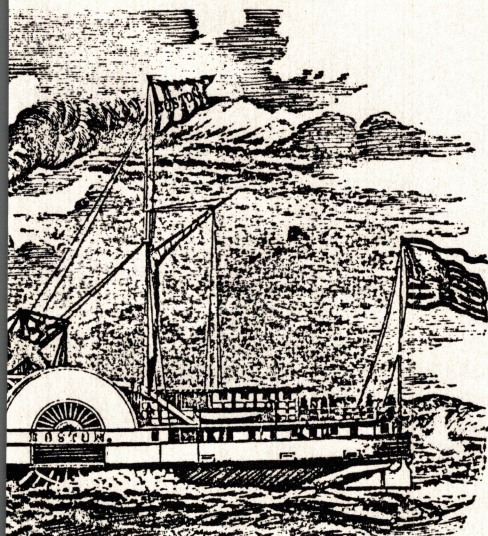
CARLISLE BAY BEACH RESORT
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Col. Thomas Bayley, now commanding both ships, in ordering them to proceed under such difficult conditions. But, as a civilian, he was subject to military authority. The *Boston* followed the *Lewis*.

In the darkness the *Lewis* missed Bennetts Point and continued upstream several miles where she was nearly snagged by obstructions placed in the river below Fort Chapman, a Confederate bastion. Captain Hancock realized they had passed their destination and knew the *Boston*, drawing eight feet of water, would be trapped amid these pilings. Col. Bayley agreed and ordered the pilot to turn the ship around. Downstream they found the *Boston* aground on a submerged sandbar below Fort Chapman. The *Lewis*, which drew only four feet, passed over the bar.

The *Lewis* then attempted to free the



Boston but the bow of the 574 ton vessel was stuck fast. It was 11:00 pm and the tide had begun to ebb. The *Lewis* headed downstream to locate and advise Gen. Birney of the *Boston's* situation.

Captain Faircloth of the *Boston* realized his ship was a huge sitting duck and dawn was six hours away. The vessel was packed. On board were 300 soldiers of the 34th Regiment of Colored Troops commanded by Col. James Montgomery and approximately 90 cavalymen with their horses. Montgomery did his best to defuse a panic situation among his men: Blacks in Union blue were considered fugitives by the South and were often shot when captured.

With the first light of dawn Capt. W.E. Earle, CSA, ordered two cannons placed in positions to bring effective fire against the *Boston's* bow and port side. Minutes later a six pound shot whistled over the vessel. A second round pierced the hull. The *Boston* carried no cannons and rifles were useless against the distant artillery. The 400 men aboard ship huddled against the starboard side and stern to protect themselves. According to the

(Continued on Page 102)

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The Fire Goby

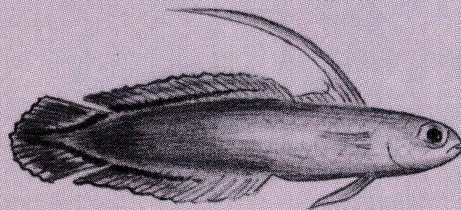
(*Nemaptereleotis mangificus*)

Gobies are tiny fishes that have no gas bladders and are sedentary—always sitting on the bottom near a protective hole or crack in the reef. They have strong ventral fins which unite beneath the body to form a sucking disk by which they can attach themselves to a rock, and with this device they can hold themselves in position against the ocean surge. They are ichthyologically separated from the similar bottom-dwelling blennies and clinids by the fact that they have two distinct dorsal fins while the dorsal fins of blennies and clinids are single and continuous.

□ The Gobiidae is the largest family of tropical fishes, with about 700 species found worldwide. The fire goby, *Nemaptereleotis magnificus*, is an Indo-Pacific species. It is widespread and common, according to ichthyologists John Randall and Gerald Allen, who recorded it from Celebes, New Caledonia, the Society Islands, Tuamotu Archipelago, Marquesas Islands, Pitcairn, Austral Islands, Cook Islands, Johnston Island, Eniwetok, Guam and the Palau Islands. They also noted the goby from the Seychelles, Comoro Islands, New Guinea and the Great Barrier Reef. The two scientists reported that they rarely saw the fish below 90 feet. □ The fire goby appears two-toned, the front half of the body light gray, almost white, and gradually shading to red toward the caudal fin. The head is light yellow. The most obvious physical characteristic of the fire goby is its extremely elongated dorsal fin, with the filamentous part of

the first dorsal spine usually extending the length of the entire soft dorsal fin. The first part of the genus name, *Nema*, means "thread," and refers to this characteristic. Other gobies of this genus (*N. helfrichi* and *N. decora*), which share the same range, do not have the elongated fin, and range into deeper water than *magnificus* (Randall, Allen).

□ The two ichthyologists noted that the fire goby prefers a habitat of sand channels on the outer reef slope or on the upper edge of the slope where there are patches of sand or fine rubble. *N. helfrichi* and *decora*, by comparison, are confined to sand channels on the deep outer slope. The fire goby typically hovers just above the bottom, always near a burrow, with the body angled upward. Facing the current, it feeds on passing plankton, principally copepods and



other planktonic crustaceans. When alarmed, the fish will retreat instantly into its burrow. Whether the fish constructs its own burrow, or uses those left behind by other organisms, is not known. Randall and Allen suspect that the goby modifies existing holes. □ The fire goby is generally seen by itself or in pairs, but the juveniles form small groups of up to 10 individuals, according to the ichthyologists. The fire goby is a tiny fish, its maximum length about two and one-half inches. In spawning, the male goby usually puts on a courtship display for the female and after she lays her eggs in a protected cave or hole in the reef the male guards the eggs while they incubate. >

Photo By Chris Newbert - Text By Hillary Hauser

Newbert took the photo in 40 feet of water at Moore Reef in the Coral Sea. He used a Canon F-1 camera in a Hydro 35 U/W housing, 100 macro lens, Oceanic 2003 strobe, Kodachrome 25, 18 inches from the subject.



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SALVAGING THE BOSTON

(Continued from Page 99)

New York Times the vessel was struck 75 to 80 times by solid shot and the boiler was hit. The bombardment lasted nearly four hours. Two crewmen were killed, along with half the horses. Six men drowned attempting to swim to shore which was 75 yards distant.

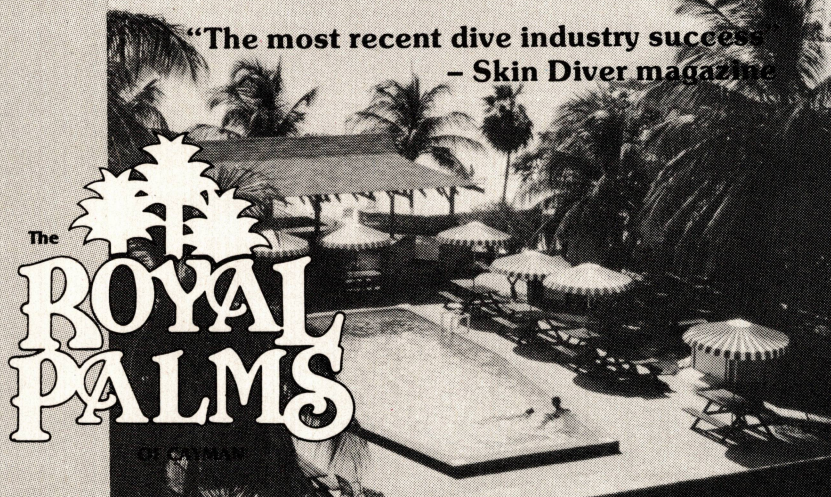
At 10:00 am rescue forces arrived on the scene. Heavy artillery from navy gunboats forced Capt. Earle's battery to withdraw. Commanders of the rescue ships realized it would take hours to extricate the *Boston* from the sandbar. And, the Confederates would use this time to bring heavy guns to the nearby fort. Therefore, Gen. Birney ordered the *Boston* evacuated and destroyed. She was set afire with the horses, living and dead, on board. The stern and midships slipped below the blackwater and fire consumed the bow to the waterline.

The *Boston* was valued at \$120,000 and carried \$130,000 of war material. She was built in 1850 in New York City. Below the waterline her hull was sheathed in copper and her timbers pinned with brass spikes and copper dowels. Prior to the war she carried passengers and freight to major cities in the northeast. The Army leased the vessel in April 1861. And, the *Boston* was the first ship used to transport troops in the conflict. In March 1864 the federal government purchased the ship for \$90,000.

In January 1866 a group of private individuals obtained a salvage contract from the army and removed the ship's machinery, anchors and safe. The massive hull slowly settled into the bar. Worms, rot and the relentless tidal action of the Ashepoo during the following century disintegrated the exposed timbers and frames. Crabs and eels made their homes amid the bowels of the vessel.

During the late 1970s I became interested in the *Boston* after reading accounts of her destruction in the War of the Rebellion. Scuba diving has been my hobby since 1966 and is the vehicle to satisfy a childhood interest in history and treasure hunting. Over the years I've researched and explored scores of historic sites and recovered thousands of objects: coins, firearms, glassware and fossils. Many of these objects have been donated to the Museum of Arts and Sciences in Jacksonville, Florida.

South Carolina has a program/partnership for scuba divers which is administered by the Institute of Archaeology and Anthropology at the University of South Carolina. The program is directed by Alan B. Albright, state underwater archaeologist. Divers wishing to explore state waters for artifacts and fossils must obtain a hobby license from the institute. This con-



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tractual arrangement requires a diver to file monthly reports describing sites visited and objects recovered. The state is entitled to a percentage of all finds and reports are held in strict confidence. I obtained a hobby license in 1978. With my partner, Larry Tipping, I explored numerous sites in the Low Country, a vast region of marsh and hummocks between Savannah and Charleston.

Our discovery of the *Boston* hinged on a brief conversation with a fisherman at the Ashepoo River bridge on Bennetts Point road. Some would say we were lucky. I believe it was fate.

On May 19, 1979 Larry and I drove to Brickyard Landing on the Ashepoo River. Today this site is a bridge crossing on Bennetts Point road. Our objective was to recover artifacts from this early colonial site. After parking our car we quickly slipped into our wetsuits: The sand gnats were terrible. As I entered the water I looked toward the bridge and noticed a man standing at the railing. I waved to him, then submerged into the inky blackness of the Ashepoo. The visibility was horrible—six inches *with* a light and the current was swift. I spent an hour groping along a sand and clay bottom littered with barnacle encrusted bricks and found nothing worthwhile. Then I surfaced, swam to shore and made my way to the entry point. A small army of fiddler crabs scurried into the marsh. Larry soon joined me as did the stranger on the bridge.

This local fisherman was very interested in our diving. Larry and I explained how the equipment functioned and told of our past exploits.

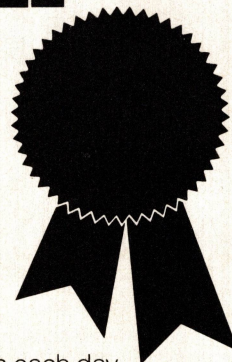
I seized the opportunity to discuss local history, namely the *Boston*. "My family has been commercial fishing this area for three generations," he said. "I don't know a lot about history myself but my daddy has some books you might like to see. If you got a few minutes follow me home. I don't live far from here."

Ten minutes later Larry and I gazed upon a map of the Ashepoo. The wreck site was clearly indicated. Allowing for error, we had the ship narrowed to a 400 yard section of river. Now we had the last piece to the jigsaw puzzle of reports in the official records. After making a sketch of the map, Larry and I returned to Jacksonville, Florida.

June 2, 1979 will be a day I'll always remember. It began at 4:00 am. We used Larry's truck and it was packed with a boat, motor and associated equipment along with diving gear and a magnetometer. Four hours later we parked the truck, applied a liberal coating of insect repellent and carried the boat and associated equipment to the river. The air was still and the morning sun told us it was going to be hot. The blackwater was as smooth as glass. In a few minutes we were in an isolated reach of the Ashepoo. This great tidal river north of Beaufort averages 150 to 300 yards in width and teems with

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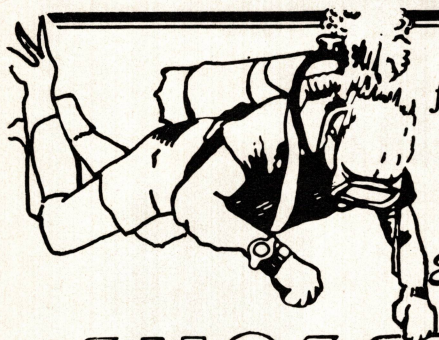
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SALVAGING THE BOSTON

countless varieties of marine life. Alligators are a common sight. The Ashepoo has a majesty all its own.

Larry and I were prepared for the search. Success would depend on a disciplined effort. Larry's task would be to crisscross the river at 50 foot intervals and travel slow enough to allow the magnetometer fish to skim across the bottom. I would monitor the instrument.

I fine tuned the device and signaled Larry to begin. "Maging" is the most boring job in the world. Larry's small boat, packed with gear, left no room for mobility. And, any movement or jarring of cables and connections to our topside black box produced false signals.

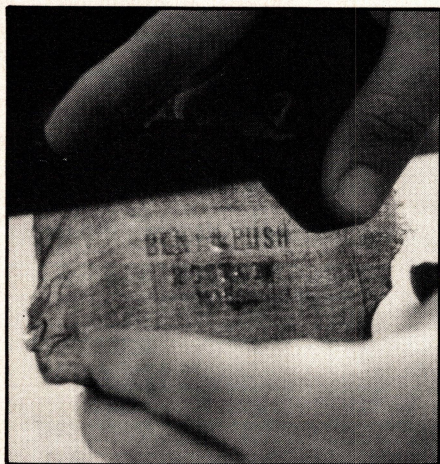
After three hours the ticking suddenly changed to a brief whine. I threw out a buoy as a reference. On the next pass I got another reading and pitched a second buoy. We then made a series of passes in the area of our floats. The mag whined continually and the needle bounced rhythmically on the meter. The signals were not strong but I remembered the *Boston's* oak hull was pinned together with brass spikes and copper dowels. And, the massive iron machinery and anchors were salvaged. Thus, disruption of the earth's magnetic field would be small: Hence low readings.

As Larry made a sweep through the center of the buoyed area I felt the probe snag and yelled at him to stop the engine. I slipped into my wetsuit, tank, regulator and associated gear. Larry dropped anchor to secure the boat against the current and ease tension on the probe. I went over the bow, into the blackwater. Larry gave me a light. I drifted to the stern of the boat and submerged holding the probe cable. At five feet the last vestige of sunlight disappeared. My light penetrated two feet into the darkness. I shined it on the cable while descending. Moments later the beam played upon the cylindrical probe—lodged between two timbers covered with marine growth. We had found the *Boston*! I freed the probe then surfaced and told Larry the news. He retrieved the fish and prepared to dive. I grabbed my nylon mesh bag and dropped down the anchorline.

The anchor flukes were wedged between the stubs of two timbers. Remnants of historical drama lay scattered about—pieces of china cups and plates were partially exposed in the sand. Large copper dowels, three feet long and more than an inch in diameter, stood like giant pins. They were bright and shiny from the scouring action of the brackish water. The same was true of exposed pieces of copper sheathing which once protected the hull from worms and rot. This was nearly the thickness of a penny. Near the

bow a section of the vessel's interior was free of sand. I picked up several brass spikes and other melted brass objects. Resting against the rotted timbers were skeletal remains of the unfortunate horses—vertebrae, ribs, legs and teeth, like the jumbled pieces of a jigsaw puzzle.

The abundance of exposed brass and



Above: A fragment of silk cloth. Below: Coins, buttons, hat and saddle pieces.



photos/Howard B. Tower, Jr.

copper objects was ample proof we were the first divers to visit the *Boston* in modern times. After collecting a quantity of specimens I surfaced, crawled into the boat and waited for Larry. When he was aboard we took visual references to pinpoint the site.

We reported our discovery to the institute and made additional dives during the next two months. Examining the bones of this wreck was like blind men feeling an elephant. It required both of us to confirm the simplest of observations. We determined the vessel lay at a 45 degree angle to the shore and listed to starboard. The hull was flush with the sandbar except near the stern where it rose nearly seven feet off the bottom. The most extensive fire damage was near the bow which also lay in the shallowest water. The stern, which apparently sank as the vessel burned, rests in the deepest water.

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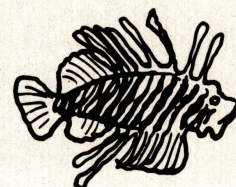


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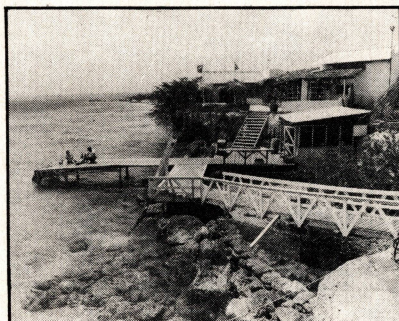
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SALVAGING THE BOSTON

In August, Ralph Wilbanks, assistant U/W archaeologist, asked me to suspend diving on the wreck until the state conducted a survey dive. This would occur during the fall as the institute was currently involved in several field projects. Larry and I honored Ralph's request.

On October 20, 1979 Larry and I loaded our gear in the state's boat and helped Ralph launch it at the Bennetts Point ramp. Minutes later we anchored. It was our responsibility to buoy the site for Ralph who explored the wreck, and took measurements and samples of artifacts.



Collection of brass uniform buttons, some nearly as bright as when brand new.

Afterward, we were permitted to dive. In January 1980 I wrote Alan Albright asking permission to excavate the *Boston*. Ralph replied stating we could work the vessel under our hobby licenses and keep the institute informed via the monthly reports. We planned to begin in March.

Then came the bad news. Alan learned the *Boston* was still federal property and the state could not authorize excavation. Alan suggested we contact the Navy and provided the address of the Office of the Curator—a Navy agency responsible for historic vessels.

Thus, I began my search. Little did I realize the last time *anyone* sought to excavate a federal vessel was in 1968. And, there was only a faint trail in the federal bureaucracy for me to follow.

I contacted the Navy Office of the Curator and three weeks later was told this would be an Army matter because the *Boston* was an Army ship. On May 16, 1980 my request for salvage was forwarded to the Commander, U.S. Army Center of Military History in Washington D.C. On May 30 I wrote the commander and asked permission to excavate.

Nearly four weeks later I was advised in a letter the center had no jurisdiction in this matter and my request had been forwarded to the Navy and Old Army Branch, Military Archives Division, to de-

termine if the *Boston* was federally owned. I was told if, in fact, the ship was federal property, I "should contact the Tax and Property Law Branch of the Judge Advocate General's Office for further guidance."

The bureaucratic merry-go-round picked up speed. My ship was confused with a Confederate *Boston* and the information concerning both vessels was mixed together.

One day Alan Albright called asking how I was doing. I filled his ears with my frustration. "Why don't you call Charles McKinney. He is the manager of the Federal Antiquities Program and may be able to assist you." As far as I was concerned the last thing I needed was another bureaucrat but I kept his number on file.

Several weeks later the phone rang. It was Charles McKinney. We talked for an hour about the *Boston*. McKinney was interested in a model project to demonstrate the government's willingness to work with responsible individuals. Because Alan was willing to supervise our excavation McKinney agreed to recommend federal authorization for salvage. I learned disposition of federally owned historic vessels is now the responsibility of the Department of Interior.

Time passed. Over the following months Alan, Charlie and I discussed the *Boston* project at length. There were numerous details to be considered. I soon learned the salvage of any historic vessel was considered a serious undertaking by the professional archaeological community. And, the *Boston* salvage, conducted by Larry and I, under the direct supervision of a state archaeologist with federal blessing, would be a precedent. In correspondence dated May 15, 1981, McKinney authorized an archaeological reconnaissance of the site. This would include test excavations and evaluation of various salvage techniques.

On June 17, 1981 Alan, Charlie and I met with Dr. Robert Stephenson, state archaeologist at Columbia, SC. I was granted a salvage license and a site was selected to store artifacts pending division. Possible salvage techniques were also discussed.

Larry and I began on site work June 20, 1981. Initial test excavations established the wreck was covered with a blanket of sand and mud which varied from 6 to 24 inches deep. All relics had settled to the bottom of the hull. To our amazement a great deal of cloth, rope and other fibrous material lay preserved under the mud. Iron saddle and cinch buckles retained much detail. They were light as a feather and brittle like a cracker. The iron had been chemically reduced to a carbon compound.

It was evident the best salvage technique would be to use a small water jet with an adjustable nozzle. This would allow us to vary the force and intensity of the jet depending on the density and

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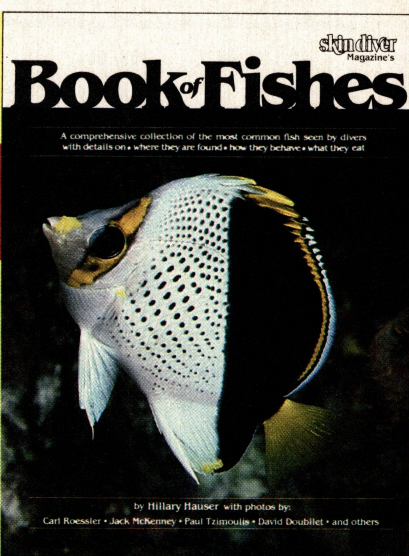
For more than ten years the most popular column in *Skin Diver* magazine has been its beautifully illustrated and highly informative Fish of the Month Series. Now the best photographs from that exciting series have been brought together under one cover in *Skin Diver* magazine's *Book of Fishes*. With the exquisite photos is a newly revised and updated text by the author of the original column, Hillary Hauser.

The text, based on the most recent scientific research, tells how the different fishes behave, where they are found, what they eat, and more intimate details about their life cycles. Organized so that all the fish of a particular family are grouped together, the book becomes an excellent identification guide illustrated with photographs that are among the best ever taken of marine life in their natural habitat.

The photographs

The world's leading underwater photographers have been contributing to the Fish of the Month column. Carl Roessler, Paul Tzimoulis, Jack McKenney, David Doubilet, and Chris Newbert are some of the important photographers whose pictures are included.

Technical details on how the pictures were made accompany the photographs. The film, equipment and exposure used are all given.



For amateur underwater photographers this information alone is worth the price of the book because it is in effect the logged notes of the leading professionals.

The drawings and maps

Detailed drawings accompany each of the photographs. These show juvenile stages and alternate forms which are sometimes strikingly different. These drawings, plus maps to show the areas in which the various fish are found, make the *Book of Fishes* one of the most useful and informative books for divers recently published.

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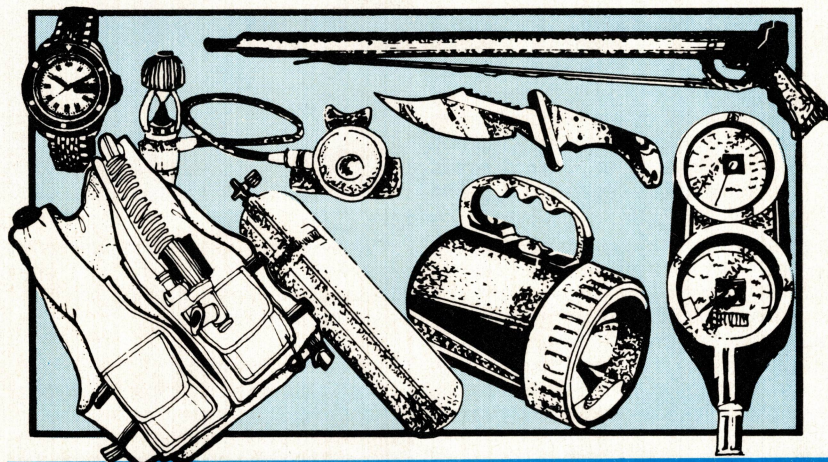
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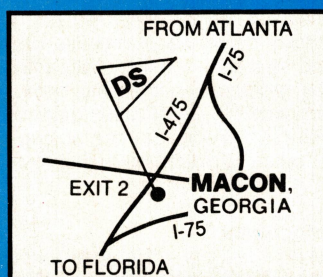
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SALVAGING THE BOSTON

depth of overburden. And, delicate artifacts would not be destroyed.

To assure an accurate professional excavation, a baseline, tagged every five feet, was strung down the center of the vessel from bow to stern. This was no simple task working in swift current and less than two feet of visibility with a light. An iron square, five feet on each side, was lowered on the site and positioned along the baseline. The *Boston* was excavated one square at a time. As the artifacts were recovered they were placed in large baskets lined with nylon mesh. When a square was worked the baskets were raised and the artifacts removed, catalogued and placed in containers. The baseline, squares and other data about the site were reflected on a grid chart which was updated each day.

This disciplined manner of excavation produced a fascinating array of objects, military and civilian, of the period. Each basket raised from the blackwater gave us a view of life and times aboard the *Boston*. Interesting finds recovered included hundreds of hardtack biscuits, the basic ration of the Union soldier, charred by the fire and preserved by sand and mud. Uniform buttons were often as bright and detailed as the day they were worn. Artifacts included ornate sword handles, foreign coins, fragments of uniforms and tents, cavalry accouterments and a pipe tamper—two and one-half inches tall—a miniature hand holding a pipe crafted in bronze.

Fire damage aboard ship was anything but uniform. In some areas the intense heat fused large pieces of brass together like wax. We refer to such objects as war sculptures. Yet, from the same basket may come a pair of brass cavalry sabers, accouterments for an officer's hat, untouched by the heat. A lead hawser pipe was recovered in excellent condition. The hammer marks made by the craftsman in 1850 are still visible.

The excavation continues. We hope to recover many weapons when the stern is worked. To date, thousands of artifacts have been recovered and divided with the institute under the terms of our contract. The excavation should be finished this year. The Aquifer Dive Center, 4564 Atlantic Blvd., Jacksonville, FL has supported the project by providing extra diving equipment when required.

Objects from the *Boston* are available to the public and may be purchased from Southeastern Historical Antiquities at 3332 Eman Drive, Jacksonville, FL 32216. Collectors may obtain a list of these items for \$1 and a self-addressed, stamped envelope. A small artifact from the *Boston* is included with each list.

It is my hope this project will set a trend

across the country with respect to the controlled exploration and excavation of submerged archaeological resources. An enlightened partnership between the diver/entrepreneur, professional archaeologist and bureaucrat will conserve and secure America's cultural heritage. »

ELECTRIC CITY TREASURE HUNT

The Electric City Dive Club of Great Falls, Montana is sponsoring an underwater treasure hunt on July 13-15 at Piskun Reservoir. For more information write: Treasure Hunt, c/o Electric City Dive Club, 5007A Ave. C, Great Falls, Montana 59405. »

EMERALD SEA PHOTO

Doug Cameron, president of Emerald Sea Photo Ltd., will be expanding his services during 1984 to include a series of underwater photography courses and escorted photo dive cruises.

Basic one week courses will be conducted at the Hotel Sidney, Sidney, B.C., April 21-28; Campbell River Lodge, Campbell River, B.C. October 20-27; on-board 52 foot *Sea Venturer*, Barkley Sound, Vancouver Island, B.C., August 4-11; Spanish Cove Resort, Grand Cayman, June 23-30. An advanced course will also be offered onboard *Sea Venturer*, August 18-25. Use of underwater photo equipment, film, daily E-6 processing, accommodations and meals are included in the course fee.

Escorted photo-dive cruises will be on-board the 57 foot *Clavella*, Gulf Islands, April 7-14 and October 6-13; 42 foot *Oceaner*, Queen Charlotte Islands, July 21-30 and Port Hardy, Vancouver Island, September 1-8. Accommodations, meals and free use of underwater camera systems are included in the cruise cost.

For complete information, newsletter and applications contact: Emerald Sea Photo Ltd. in Richmond, B.C. »

LA MER/GALAPAGOS

La Mer Diving Seafari, Inc. is offering a live-aboard program to the Galapagos Islands June 10-28.

Expedition members will live aboard the 70 foot *Encantada*. She is fully equipped for diving with two air compressors, 20 aluminum 80 tanks, two support dinghies and will conduct two to three dives per day.

The group will be accompanied by a private escort as well as a local naturalist who is familiar with the islands' wilderness—above and below the water.

Time underwater and on land will be maximized by night sailing, making it possible for the group to visit both the east and west islands of the Galapagos.

The *Encantada*, with five crew members and ten guests, will sail from east to west through the island group exploring the islands of Isabela, Ferdinand, Hood, Gardiner, Champion, Devil's Crown and others. »

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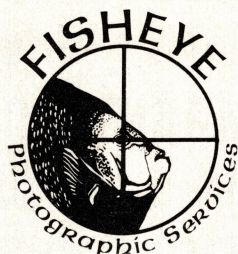
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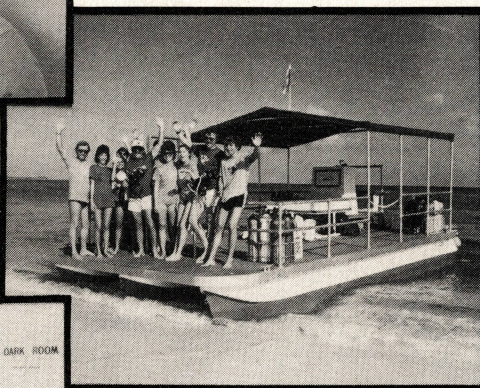
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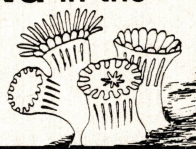
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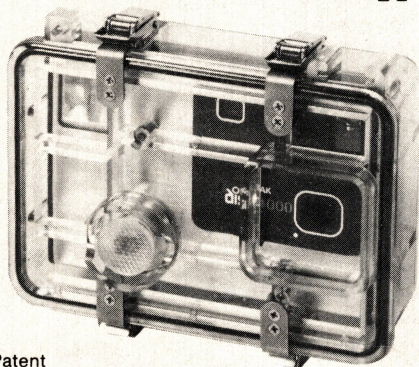
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DIVE CONTROL SYSTEM

BY HILLARY HAUSER

The Silent World, it has been called—an undersea paradise where the only sounds a diver hears are his/her own air bubbles. But this silence is not so golden in the world of commercial diving, where a diver working on the bottom at the end of an air hose has to tell his surface support what he needs: whether or not he wants something hauled up; if he needs more line or more air; or if he wants to go up or down.

Underwater communication is a difficult technology. Usually it has to be combined with a life support system that allows a topside tender to monitor the diver's air supply, his depth and time below. No matter how simple a diving operation might be, the communication/life support part of it remains complex and bulky: Control vans with all the valves and gauges for deepwater operations usually weigh a ton and have to be transported to the dive site by truck.

Now, a Santa Barbara, CA company, Diving Systems International, has come out with an underwater life support/communications system that weighs 45 pounds and fits in a suitcase-sized box. It's for shallow water operations that require the same equipment used in deepwater projects, and it is the first commercially produced system of its kind.

The Dive Control System, as it is called, enables commercial divers to work in water down to 130 feet without the usual big production of getting gear to the work site by truck and crane. Also, sport divers doing commercial work can use the system easily.

The system is representative of how DSI continues to boost diving technologies as man goes deeper into the sea. The company has a history that began with diving helmets to substitute for those heavy brass hardhats, and today it is developing a regulator that will allow a diver to work at 2000 feet. Also in the testing tanks is the first buoyancy control device ever designed for commercial use.

DSI is a small company with 30 employees headed by president Skip Dunham, 38 (a commercial diver who became involved with the company in 1967 when it was making the Kirby-Morgan diving helmets) and administrative assistant Steve Barsky, 30 (a commercial diver and U/W photographer with a master's degree in human engineering).

Chairman of the board is Bev Morgan,

50, a longtime diver with a colorful past that includes recreational diving (with Bill and Bob Meistrell he started Dive n' Surf, in Redondo Beach) and surfing (he was editor of Surfer Magazine in 1963).

Morgan was diving commercially in 1960, the year he designed his own diving system sort of in self-defense. He figured there had to be a way to do an underwater job other than trudging around the ocean bottom inside a heavy, brass hardhat that allowed limited viewing and moderate mobility. What he came up with



photos/Bob Ponce

Left to right: Steve Barsky, Bev Morgan and Skip Dunham with control system.

was a light, space-age version of the hardhat—with air and diver-to-surface communication lines incorporated into a protective fibreglassed helmet. He also developed a bandmask—essentially, the wet version of the helmet—worn much like the recreational diver's facemask but with the same life support/communications system.

Eight years later, Morgan joined with another Santa Barbaran, Bob Kirby, to produce the helmets and bandmasks commercially and the name Kirby-Morgan took off in the commercial diving world. The lighter gear revolutionized underwater operations because divers could now swim instead of walking on the bottom. Also, trained scuba divers could easily use the equipment, whereas hardhat operations required lengthy training programs for divers.

Today, DSI calls the helmet Superlite 17 and the bandmask, Heliox 18, although the Kirby-Morgan insignia is still on the regulator casings. Like their predecessors, these diving systems will be found wherever underwater work is going on, all over the world.

When flight 90 crashed into the Potomac during the winter of 1982, it was a Superlite 17 helmet that enabled divers to descend to the grisly scene to do the salvage work. Other underwater systems froze, the moving parts of regulators stuck open or shut, cutting off air needed by divers to work beneath the frigid waters of the Washington, D.C. river.

(Continued on Page 128)



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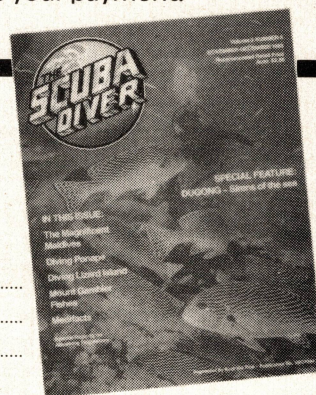
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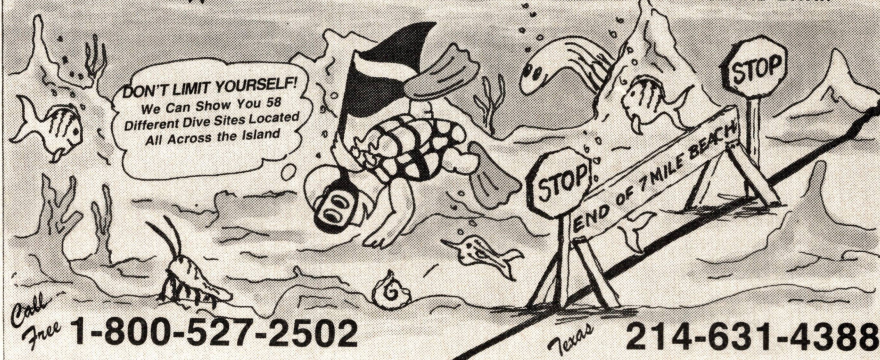
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Bull Shoals Lake, centrally located on the Arkansas-Missouri border, is a diver's dream come true. Sporting incredibly clear water and varied underwater terrain, the lake allows one to pursue his/her own particular dive interest such as exploring, photography, spearfishing or simple underwater sightseeing.

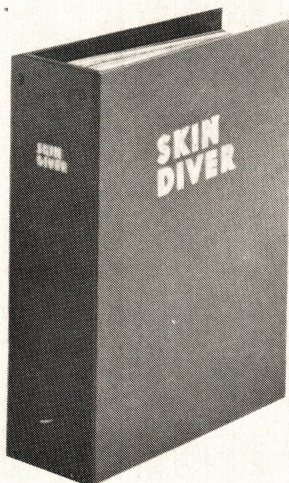
temperatures can rise into the 80s. In some places the lake is over 200 feet deep but many areas abound for the shallow diver also.

ters. These places provide ideal areas to search for old bottles and other antiquities. Topographical maps showing the location and depth of these are available.

photos/Steve | 11222

caves. Only the very experienced cave diver should attempt exploration of these. Also for the experienced, vast stands of submerged forests lie below the water's surface at various depths. Rumors are often heard of a sunken gold mine, complete with gold, although the fact has never been documented.

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ful white bluffs surrounding the lake (some refer to Bull Shoals Lake as "the gray ghost") make visibility outstanding and night diving a pleasure. Some night divers enjoy the native sport of Ozark Mountain lobster searching. These lake dwellers are more commonly known as crawdads and can be quite a delicacy when boiled like their more traditional counterparts. Found only at night, the crawdads have been known to reach up to ten inches in length.

With such clear water and good visibility, photography in this lake is beyond compare. A most colorful fish, the bream or bluegill, is found in abundance here, as well as many other breeds. Many photographs of fish in this lake have appeared in national publications. Because this reservoir is so large diving here is never crowded.

Arkansas is one of three inland states that allow spearfishing of game, as well as rough fish. During the season, which runs from June 15-March 15, divers are allowed to spear half of the regular fishing limit on each respective breed, except black bass. The Arkansas Game and Fish Commission stocks the lake annually with 200,000 trout and catfish, and 50,000 walleye. It is not unusual for a diver to bring in catfish weighing 30 pounds or more, with some weighing better than 50 pounds. Walleye, white bass, striper, bream and crappie are also plentiful, and

divers take their share of these, with wall-eye ranging up to 16 pounds and larger.

A current Arkansas fishing license is required and spearfishing is allowed during daylight hours only. The Arkansas law also requires the display of a dive flag



while spearfishing. Some of this lake extends into the state of Missouri, where regulations may be different, so the diver should check locally for state laws.

A full range of facilities is available on the lake and adjoining areas. There are five air compressors on the water and another nearby to provide air fills. All air stations handle dive gear and also have boats for rent, ranging from small fishing boats to large pontoons. Two local shops have scuba gear for rent: Bull Shoals

Boat Dock, in the city of Bull Shoals, and Maila Halum Shop in Lakeview. Diving instruction is also available from a PADI certified instructor.

One of the largest Midwest lakes, Bull Shoals has 19 Corps of Engineers camp parks, containing 834 campsites with concrete pads, electricity at most, water close by and showers at some. For those who might like to spend their time on the water, completely equipped houseboats may be rented from the boat dock. Since this is a Corps of Engineers facility, there are no fees for the use of the lake, public swimming, picnic areas, or the many launching ramps.

If you are not turned on to camping, there are many motels and resorts to meet the most exacting needs, including pools, TV, air conditioning, tennis courts, restaurants and a complete range of accommodations from single rooms to housekeeping cabins and lodges.

Scuba diving is not the only sport Bull Shoals has to offer the visitor. Traditional fishing is excellent on the lake and the White River, with its world famous trout, flows below the dam. There is a nine hole golf course bordering the river and several other tourist attractions in the area.

If you love scuba diving, for the underwater sights, sport, or hobby involved, give Bull Shoals Lake a try. You'll find everything you've been looking for and more—right at your own back door. 

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Dive Bubbles

Take the
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TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE

All basic scuba students are taught to ascend from a dive no faster than 60 feet per minute. This rate was formulated by the U.S. Navy to prevent gases, dissolved in body tissues at depth, from coming out of solution too quickly and forming bubbles which can cause an air embolism or the bends. No matter how shallow or how short, every dive is a decompression dive—the 60 foot per minute ascent rate is your decompression.

Although divers know how fast they should ascend, determining this is another matter. Unless you monitor the second hand of your dive watch and your depth gauge at the same time, you may always wonder if you are going too fast. Now, however, there is a little device that takes the guesswork out of ascent rates. Called a Dive Bubble, it is a one inch in diameter, injection molded plastic sphere. The Bubbles for freshwater use are bright yellow; the saltwater Bubbles are half yellow, half green. The freshwater Bubbles are hollow, the saltwater Bubbles contain a small steel weight to give them the density needed to rise at the correct rate.

Three Dive Bubbles come in an ABS plastic holder, 3.25 inches long, that is easily attached to your pressure gauge hose. When you are ready to ascend you simply push a Bubble out of the holder

with your thumb and follow it to the surface. Don't follow directly under it because your exhaled bubbles will accelerate its ascent. When you reach the surface, retrieve the Bubble and push it back into the holder.

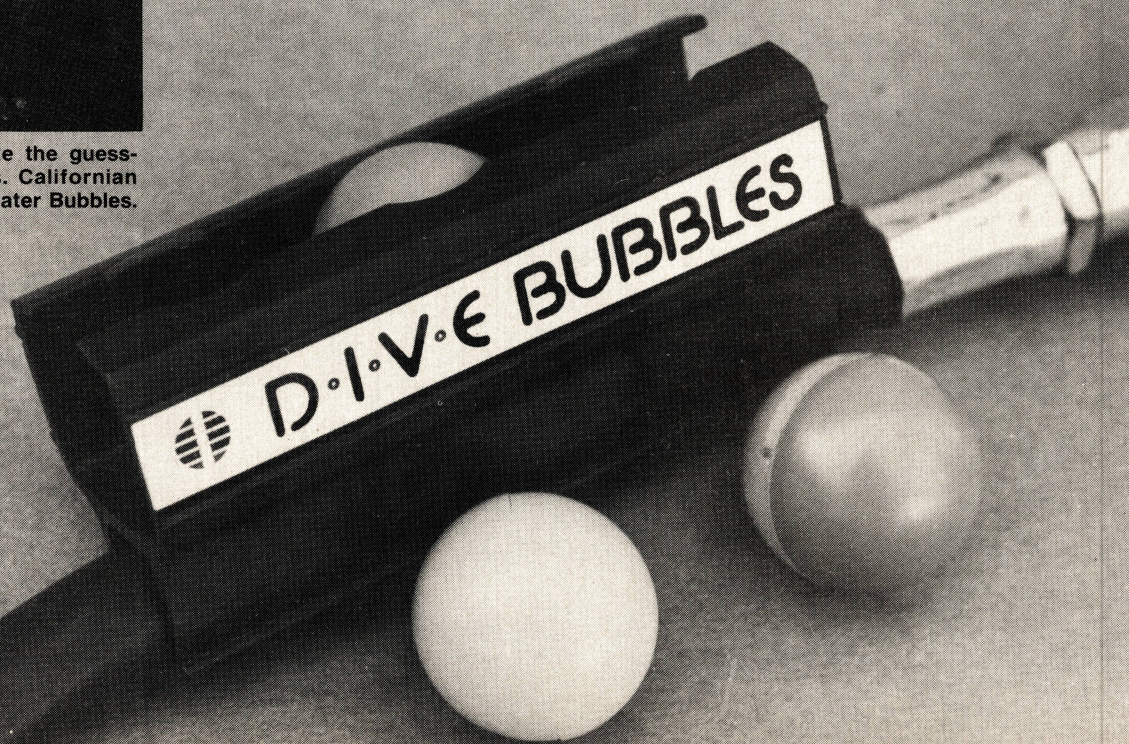
Dive Bubbles were invented by Bill Dick, who graduated from the University of Ottawa with a degree in chemical engineering. When Dick took his basic certification course six years ago, he was intrigued by the concept of providing something to convey the correct ascent rate. The idea remained just that for awhile because Dick had no time to develop it. Last year, however, he began serious work on the project and Dive Bubbles are the result.

I used saltwater Dive Bubbles on four dives with visibilities ranging from 5 to 75 feet. They were easy to see and, usually, easy to retrieve. On one dive there was quite a current which carried my Dive Bubble away. You wouldn't want to use them while ascending a fixed line in a current because of this.

Instructors should find Dive Bubbles a valuable tool in teaching correct ascent rates. (Remember: The all yellow Bubbles are for pool use; the yellow/green Bubbles must be used in the ocean.) Dive Bubbles are sold in most dive stores. A holder with three is under \$20; there are special instructor packages with many Bubbles also available. You can get all freshwater, all saltwater or a combination. For more information write: Dive Bubbles, Inc., 3051 Universal Drive, Mississauga, Ontario Canada L4X 2E2.



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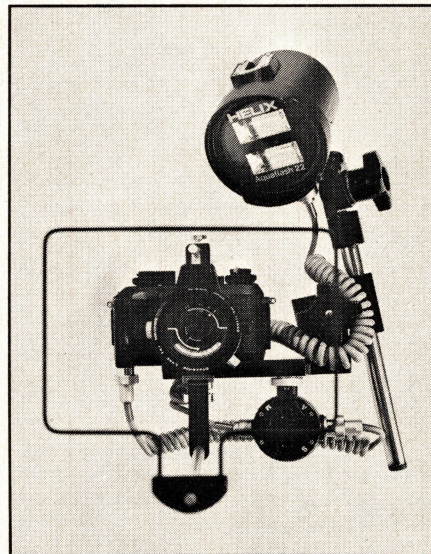
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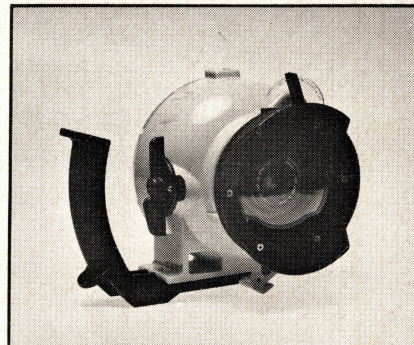
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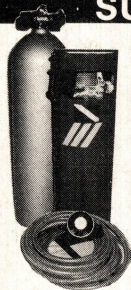
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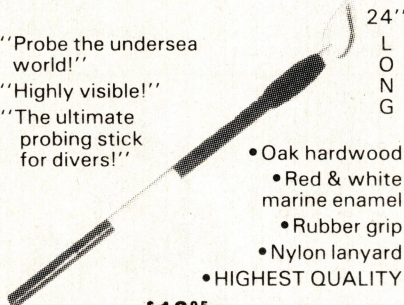
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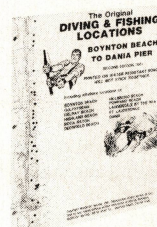
New Books

(Continued from Page 80)



14 Recent Developments in Side Scan Sonar Techniques—

With key articles by B.W. Flemming, M. Klein and P.N. Denbigh, this book is designed for the serious sidescan sonar enthusiast. Includes important calculations. \$16. Central Acoustics Lab., Univ. of Cape Town, Rondebosch 7700, So. Africa.



15 Diving and Fishing Locations, Boynton Beach to Dania Pier—

This second edition includes black and white photos of the shoreline to assist divers in finding sites. Depth, marine life and bottom descriptions. \$6.95. Institute of Marine Science, 1428 SW 12th Avenue, Pompano Beach, Florida 33060.



16 The Shipwrecks on the Chesapeake—

By Donald G. Shomette this book discusses the shipwrecks in this area from 1608-1978. It is divided into five periods: colonial, revolution, age of transition, Civil War and modern. \$18.50. Cornell Maritime Press, Inc., P.O. Box 456, Centreville, MD 21617.



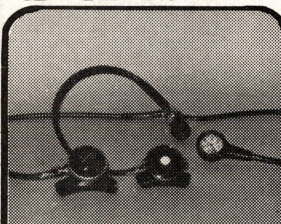
17 Hazardous Materials and the Search and Recovery Team—

By Stephen F. Hardick and Peter Slaton, this manual is for dives near hazardous materials when time won't allow waiting for experts. \$4.95 plus 50¢ shipping. Search and Recovery Associates, P.O. Box 1105, Alpha, New Jersey 08865

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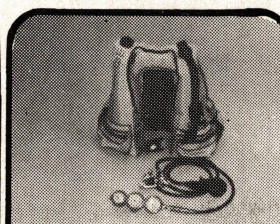
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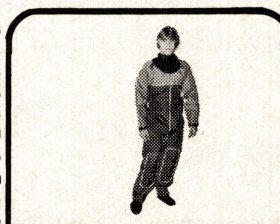
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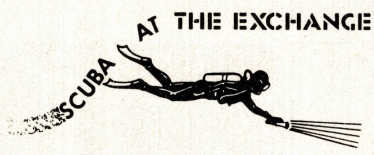
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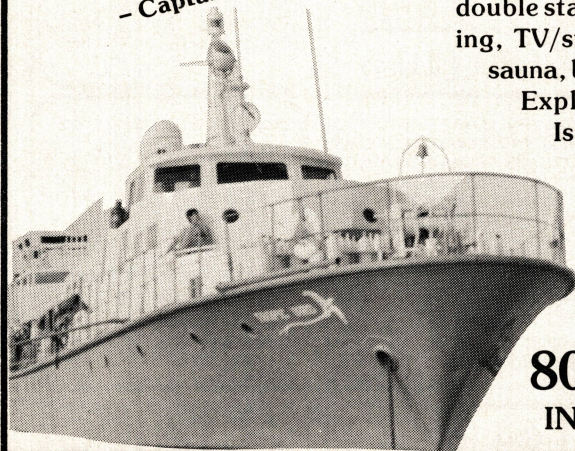
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FOR DIVERS

BY FRED BOVE, M.D., PH.D.

We have heard from a number of divers who developed coronary artery disease and required bypass surgery to obtain relief from their symptoms. The question that always comes up is whether diving can be resumed after the patient has recovered from the surgery.

To answer this question properly requires a thorough knowledge of the individual diver's case history and information obtained from the tests done before surgery and the nature of the bypass operation that was performed. A little more understanding of coronary disease and the results of surgery may help to provide some understanding.

Coronary artery disease affects the vessels that supply blood to the heart muscle. For reasons we don't entirely understand, the inner lining of the vessels can be damaged by accumulation of fatty deposits and scar tissue can build up to the point where the artery is partially blocked. Consequently, blood cannot flow through the blockage at rates adequate to supply the needs of the beating heart muscle. The problem is much akin to rust collecting in a metal pipe until slowing of the water flow occurs. Normally the plumber would remove the section of blocked pipe and replace it with a new piece. In some cases, he might bypass the blocked pipe and disconnect the blocked segment altogether. In the case of the coronary arteries, the surgeon bypasses the blocked vessel with a piece of vein taken from the leg or occasionally with a segment of artery obtained from inside the chest. This procedure allows blood to flow from the main feeder artery of the body (called the aorta) to the heart muscle and bypass the blocked area so that the heart muscle can obtain enough blood to function normally and have adequate oxygen supply.

When a coronary artery is partially blocked by an atherosclerotic plaque, no symptoms may be noted until the block

has become severe enough that inadequate oxygen is delivered to the heart muscle under increased work loads, usually caused by the stress of physical activity. Often, the first symptom of a problem of this kind is a sensation of chest tightness or pain beneath the breast bone, during exercise, which disappears when the exercise is stopped. Other kinds of stress such as excitement, anxiety or anger can bring on the same kind of discomfort when a partial blockage of the artery is present.

There are several arteries that supply the heart muscle. We usually divide them into the right and left coronary arteries: The left artery has two major branches. Each of these has secondary branches and blockage of either of the secondary branches or the main arteries can occur. Thus, more than one blood vessel may be blocked. The more blood vessels that are blocked, the more likely it is that the person will experience chest discomfort when he or she does some kind of physical exercise or is under stress. If one small branch vessel is blocked, often no evidence of its presence can be sensed at all. On the other hand, if the two main branches of the left and the right are all partially blocked then the person will usually have obvious limitations with exercise. The threshold for chest pain from coronary disease varies; some people may have none at all, while others may have very severe chest tightness or pain when minimal exercise is performed.

We can test for the presence of such blood vessel abnormalities by doing an exercise stress test and recording abnormalities on the electrocardiogram. Sometimes we use other, more sophisticated tests requiring special radio isotope techniques that allow images of the heart to be obtained that demonstrate inadequate blood flow to the heart muscle.

In many cases the person with suspected coronary disease will be subjected to a cardiac catheterization procedure which involves inserting small tubes into the blood vessels. These tubes are advanced to the heart and provide the ability to take pictures of the arteries when injected with special x-ray dye. We examine these pictures of the arteries to determine which are blocked and to make decisions about treatment.

We are finding coronary disease in individuals from age 30 and beyond. Therefore, the disease can strike individuals who are currently active in sport scuba diving. It is interesting that there are a variety of factors which we think produce increased risk for development of coronary artery disease. These include cigarette smoking, obesity, hypertension, diabetes, excess emotional stress, elevated cholesterol in the blood, physical inactivity, and a history of similar disease in members of the immediate family. The disease is epidemic in proportion right

(Continued on Page 122)

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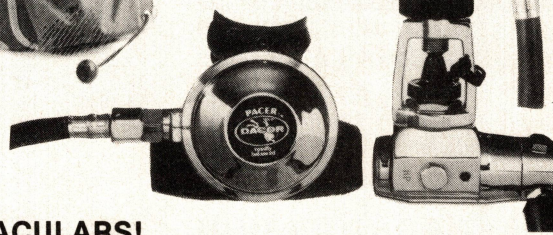
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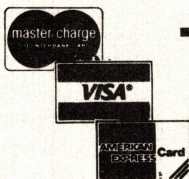


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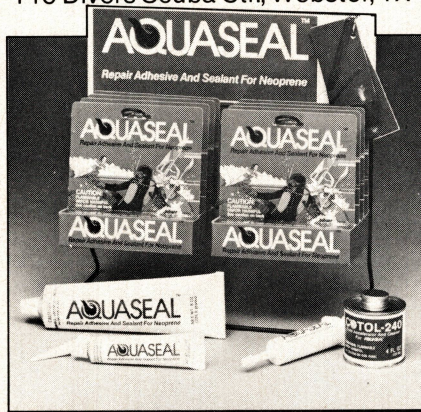
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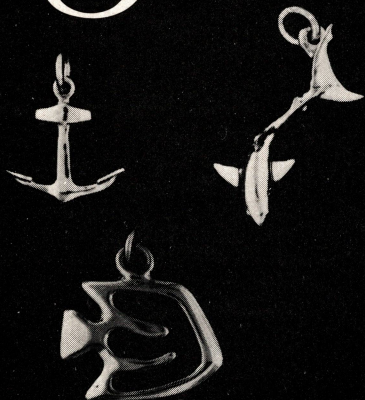
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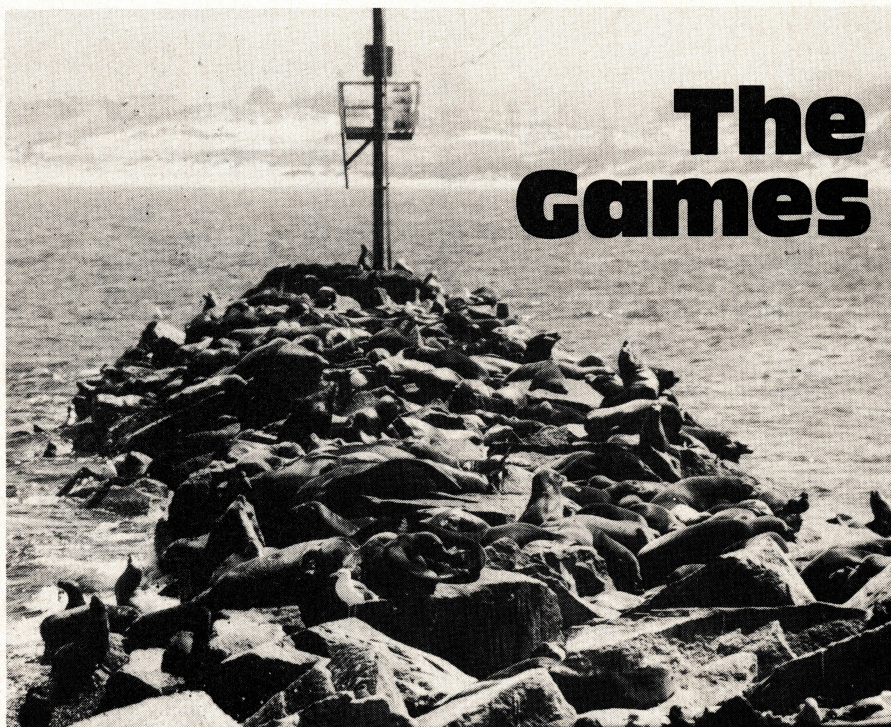
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The Games



TEXT AND PHOTOGRAPHY BY ERIC NORRIS

Forty-five feet down off the Monterey, California breakwater, a group of sea lions swoop down on my buddy and me like fighter planes engaged in mock combat. They speed out of the murky distance knowing their targets, banking away in tight turns only at the last moment. They come from above us and below us, using the turbid California water as their ally in a game of hide-and-seek. Now they surround us, moving effortlessly. I can't tell if it's five animals or 15, they appear and disappear in just moments.

To watch sea lions on land or on the surface is not to know their true form. The male California sea lion (*Zalophus californianus*) can reach a length of over six feet and weigh over 500 pounds. They appear sluggish on land, spending most of their time sleeping in the sun or keeping an eye on their territory (a few of the animals act as guards, warning the group of impending danger). Or, they doze on the surface, with one front flipper held out of the water for warmth.

But, underwater, their bulky, clumsy bodies elongate into things perfectly matched to the resistance of the sea. They become elastic projectiles that stretch themselves into turns with the twist of a flipper. They can accelerate instantly, and seem to glide, without additional driving power, for as long as it amuses them. To me, bound in yards of neoprene and encumbered by 60 pounds of lead and steel and to whom two knots of speed is the severest strain, their lack of inertia is a never-to-be fulfilled dream.

They must enjoy scaring us. Or maybe they're having too much fun to notice. Af-

ter several minutes I remember the dormant Nikonos in my hands. Turning on the strobe draws several animals closer, the high-pitched whine of the charging circuit attracting their attention. They dart right up to the strobe before peeling off.

They nip at each other and show their teeth while they shoot around us. One zips beneath me, blowing bubbles. In between the mechanical sounds of my breathing, I can hear their growling and barking above the crackling sound of the pistol shrimp. Another one comes right at me, almost touching his nose to my strobe before he vanishes with a sudden flex of a flipper. A younger, smaller one glides by directly in front of me. I reach out to touch him, but he vanishes, seeming to turn just as I think about reaching out. The rules of the game are clear; look but don't touch. To refuse their rules is to refuse the game—this is their world.

All too soon my buddy signals me she is low on air and we must surface. A new game starts. Ten or 15 animals swim slowly toward us, their heads craned far out of the water like aquatic ETs. Their eyes follow us suspiciously, watching. The leader, the boldest one, gets within ten feet of us before diving. Instantly, the brown bodies disappear in a flurry of splashing water. Underwater, the game continues as they speed under us, blowing more bubbles and caroming off each other in a frenzied ballet.

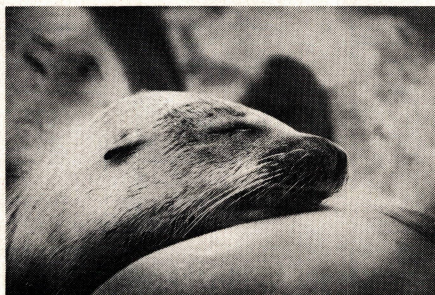
The surface game takes another twist. The sea lions swim around to the far side of the breakwater before surfacing. Then, they swim slowly toward us again and the game repeats. I make the leader dive by

Sea Lions Play



giving my fins a quick kick and rising out of the water, then, splashing him with water the way kids do in a pool.

Sometimes, sea lions will play this game endlessly. Once, after ditching my



empty tank in the dive boat, I was able to free dive with them until I was exhausted. Other times, they just aren't interested. When they don't want to play no amount of coaxing can bring them out. Like the kid who owns the baseball, they call the shots. 

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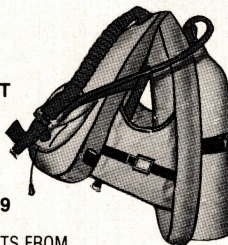
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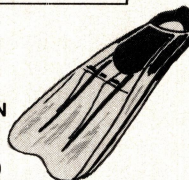


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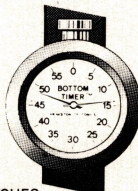
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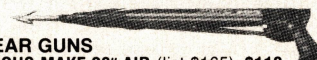


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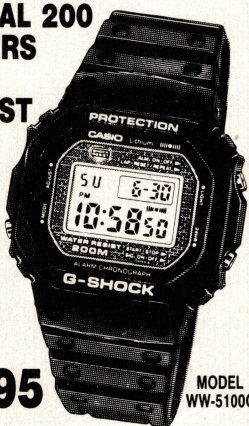
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Rx FOR DIVERS

(Continued from Page 119)

now and is presently the most serious major disease in the United States and the leading cause of death among men over the age of 30.

Diving does not provide any protection from coronary artery disease and so we find a number of divers who have developed this disease, have had bypass surgery and would like to get back into diving again.

This involves careful evaluation of all the medical information available, including the results of the cardiac catheterization. It should be clear that a person who has four or five blood vessels that are partially blocked and in whom the surgeon could bypass three and had to leave several unbypassed would still be likely to have problems with delivery of oxygen to part of the heart muscle even though the surgical procedure was successful and the person returned to normal work activities and possibly even mild exercise. On the other hand, the person with one vessel blocked whose bypass operation was done to relieve chest pain, has what we would consider complete restoration of blood flow to the heart muscle and should be able to withstand the exercise needs for sport diving. It is apparent that each case needs to be reviewed carefully by a cardiologist and each person needs to be tested after surgery to be sure that he can withstand the exercise necessary for safe diving.

The first question that one must ask after bypass surgery is whether the subject is now able to perform adequate amounts of exercise with adequate blood flow to the heart muscle. This means that a stress test should be done sometime after complete recovery has occurred (8 to 12 weeks) after surgery. This test should be observed for evidence of inadequate blood flow to the heart muscle. If a diver who has had coronary bypass surgery can demonstrate that exercise can be performed to moderate levels without any evidence of inadequate blood flow to the heart muscle, then he should be able to undertake diving again in the future. Normally, I advise patients who have had this operation to return to full activity first. Return to work usually requires 10 to 12 weeks. He should then begin an exercise program to get back in good physical condition. Sometimes the incentive to regain normal physical capacity causes people who have had this operation to get in better shape than they have been at any time of their lives, to stop smoking and avoid some of the other risk factors we know can aggravate the disease. After five or six months of a good conditioning program, it is then time to retest the

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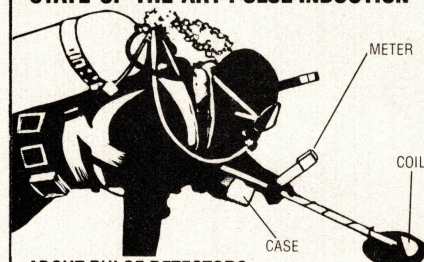
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subject to determine whether his capacity is improved enough to be able to return to diving. If at that time the exercise stress test shows the person can withstand a level of exercise that is about 12 to 13 times higher than rest in terms of oxygen use, then he should be able to return to sport diving with some care in avoiding adverse conditions such as extremely cold water or very deep diving.

At the present time there appears to be no problem with the surgery itself aggravating decompression sickness or difficulty with pneumothorax.

I would not recommend that a commercial diver who had coronary bypass surgery return to his occupation. Regulations in commercial and military diving would prevent the diver from returning to diving with coronary disease, with or without bypass surgery. However, with the sport diver having more control of his environment and with careful assessment of the type of diving being planned, it is possible to return to a sport diving program as long as moderation is used.

If you have had coronary bypass surgery and would like to return to diving, I would suggest that you talk to your cardiologist or cardiac surgeon and obtain a program for getting back in physical condition. Then determine how your performance is on an exercise stress test after five or six months of a physical training program. If everything is normal at that point and your stress test is negative, then it is possible to return to diving with careful consideration for the diving activities you undertake. 

DIVER MEDIC MANUAL

A manual by Dr. C. Gordon Daugherty, entitled *Field Guide for the Diver Medic*, is now available from the National Association of Diver Medical Technicians (NADMT). The book was developed by Dr. Daugherty from opinions and comments expressed by working diver medics who responded to questionnaires published in the Commercial Diving Journal and the NADMT newsletter Triage. This unique book is a quick-reference field guide for use primarily by emergency medical personnel.

Field Guide for the Diver Medic is now available from NADMT Headquarters, 5709 Glenmont, Houston, TX 77081. The price is \$35 plus \$3 shipping. 

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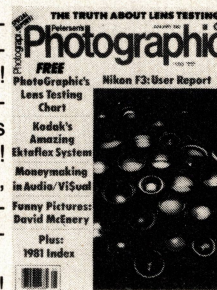
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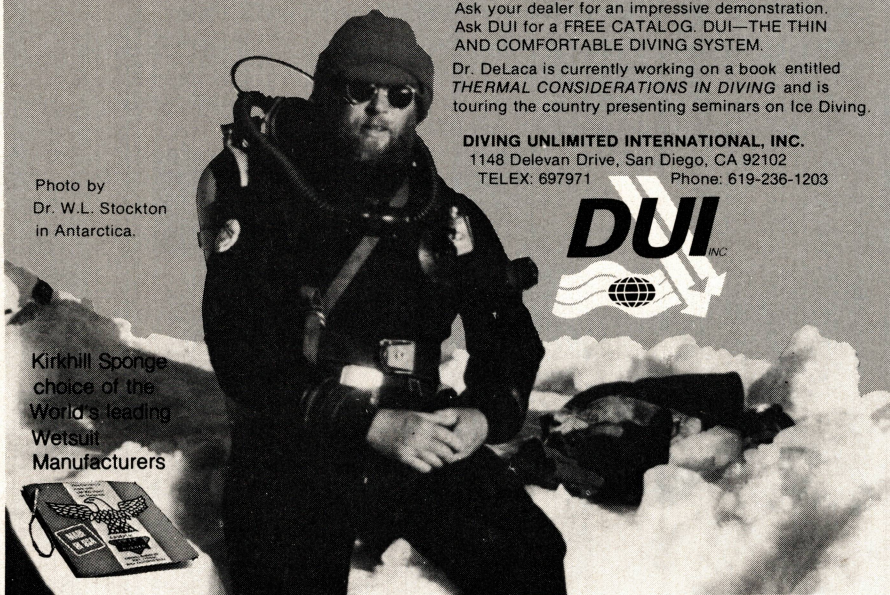
Dr. DeLaca is currently working on a book entitled *THERMAL CONSIDERATIONS IN DIVING* and is touring the country presenting seminars on Ice Diving.

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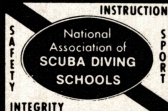
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My diving activities are centered almost exclusively around shipwreck exploration and the recovery of nautical and historical artifacts. These range in weight from mere ounces to several thousand pounds. Over the years the majority of the recoveries were usually less than 100 pounds, and on a single dive my dive buddies and I may retrieve several artifacts, each too heavy for a single diver to carry to the surface.



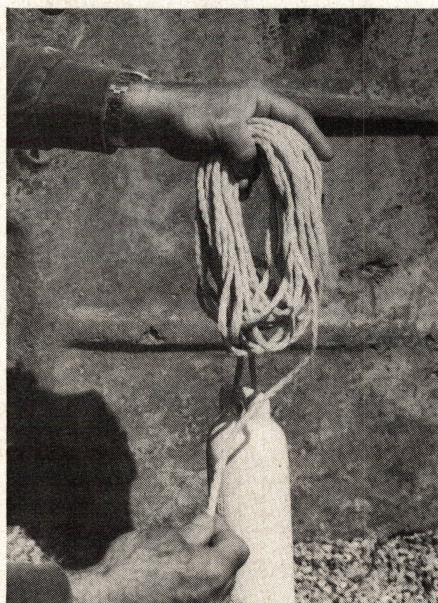
Two buoys attached to a diver's weight-belt. While U/W they float out of the way.

The use of liftbags to raise several artifacts scattered along a wreck has proved to be impractical. Each would require a separate ascent, and on deeper wrecks this cannot be done safely within the no-decompression limits without extensive surface intervals.

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Weight fastened to slide snap produces a marker buoy, released from surface.

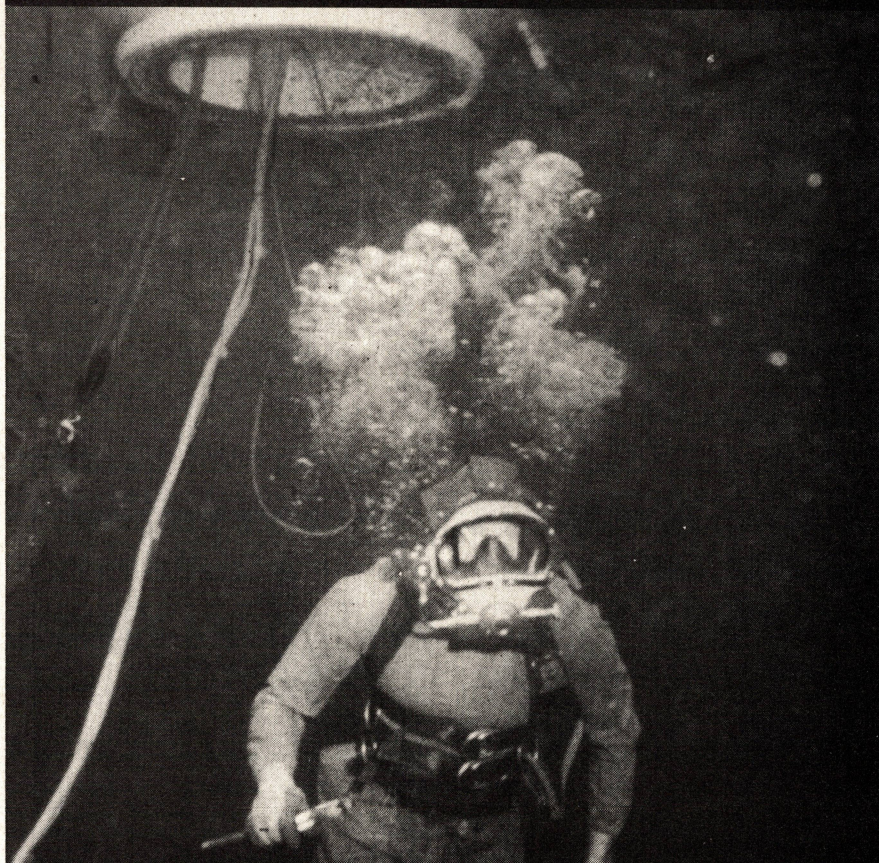


Start with the buoy end and lay up coils of line, one on top of the other. Do not use winding devices or coil around elbow.



With about three feet of uncoiled line on the snap end, take five or six turns around the coil, starting from the lower end.

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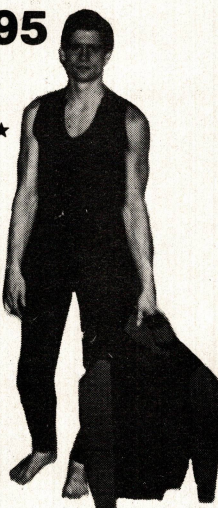
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MARKER & RETRIEVAL

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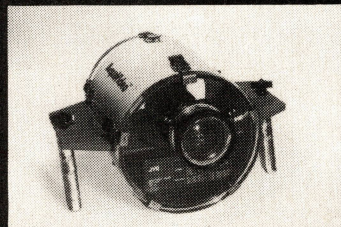
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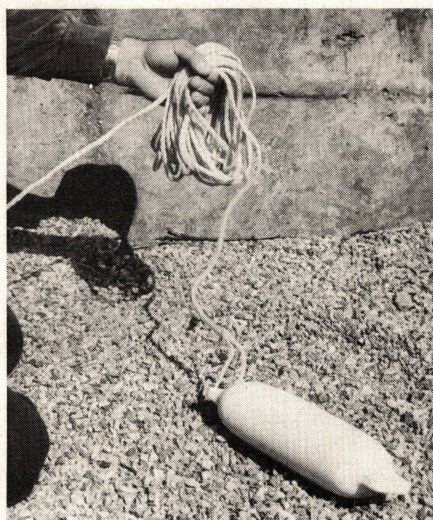
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DIVING MEDICINE COURSE

The Undersea Medical Society and Colby College are co-sponsoring Marine and Diving Medicine at Appledore Island, Isle of Shoals, Maine September 9-14. The course will include workshops, marine biology labs, HBO, and the ear and eye in diving. Twenty-eight hours of category one PRA credit are offered.

For further information contact: R.H. Kany, Director of Special Programs, Colby College, Waterville, Maine 04901; (207) 873-1131, ext. 2387.

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DIVE CONTROL SYSTEM

(Continued from Page 111)

Dunham said the helmet used in the Potomac operations is the same system that was used in the salvage of Russian gold from the English ship *Edinburgh* during the summer of 1981; it has been seen in Sanka and Budweiser commercials; on 60 Minutes; and in the underwater fight scene from the James Bond film, *For Your Eyes Only*.

But Dunham is quick to point out that the celluloid roles are only the fun stuff



Barsky, Morgan and Dunham compare the new helmet to the "John Wayne" hardhat.

and that the systems are more involved in the real world of underwater work.

Morgan talked about the demand regulator he is developing that will work to depths of 2000 feet. This will be another first in the industry, since the present state-of-the-art regulator allows a diver with a heavy workload to perform at 1000 feet. A diver who can breathe easily gives a better performance, said Morgan and time is of the essence in deep diving.

Barsky said that 2000 feet is the physiological working limit for the divers. "That's probably the deepest man can go without getting into gills," he said.

DSI has also developed a backpack/harness/buoyancy compensator for commercial divers. Such a system will allow a diver to regulate his own buoyancy, something recreational divers have had for years but which commercial divers have not used because such a device "gets in the way."

"No one has designed a backpack for commercial divers to regulate buoyancy," said Dunham. "Literally, you have to be pulled off the bottom by a yank of the hose."

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CEDAM PRESIDENT

Richard M. Sammon, of Croton-On-Hudson, NY, has been elected president of CEDAM International. Bernarr Macfadden, president of CEDAM for the past seven years, has been elected to the position of vice-chairman. CEDAM International is a non-profit organization that has placed the sport of diving and the talents of its members at the service of country, science and humanity.

In accepting his new responsibility, Sammon said, "I'd like to see local chapters of CEDAM International organized. Anyone who is interested in becoming a chapter leader can contact me at: CEDAM International, One Fox Road, Croton-On-Hudson, NY 10520." 🌿

NAUI COLLEGE

The NAUI Professional Development Center has changed its name to the National Association of Underwater Instructors College.

The college is now offering the new twenty week professional instructors course. It features the same curriculum as the full ten week program, but is designed for those who have daytime school or work obligations. Financing plans and part time work opportunities are available.

For more information please contact National Association of Underwater Instructors College, c/o 1706 N. Tustin Ave., Orange, CA 92665. 🌿

CAYMAN PHOTO COURSE

The Cayman Diving Lodge will offer its underwater photography courses April 23-30, June 23-30, July 28-Aug. 4, November 4-11 and December 9-16.

For more information please call Air-tour Universal, Inc. toll-free: Florida (800) 432-8894; United States (800) 327-8223. 🌿

BOTTOM SCRATCHER EXPEDITION

A marine biology expedition aboard the *Bottom Scratcher* to Cortes Bank and San Clemente Island off Southern California is being offered May 27-30. The NAUI sponsored underwater environment course is available to instructors and all divers. It will include the identification of marine fishes, invertebrates and algae.

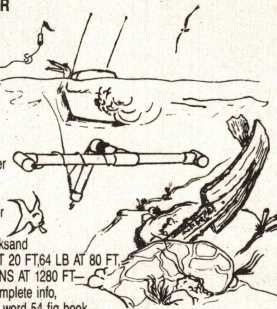
For information contact John Heine, Moss Landing Marine Laboratories, P.O. Box 223, Moss Landing, CA 95039, (408) 633-3304 or Mike Lang, Department of Zoology, San Diego State University, San Diego, CA 92182, (619) 265-6525. 🌿

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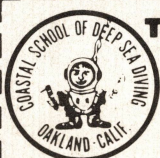
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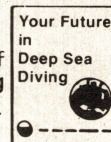


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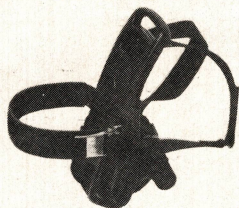
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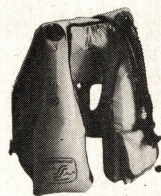
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BY HERB SEGARS

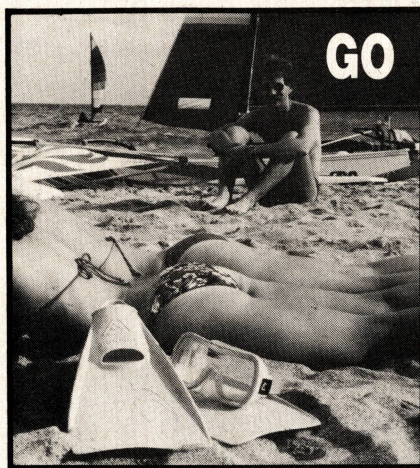
Having been certified in Grand Cayman and weaned on diving in the gin clear waters of the Caribbean, I laughed when I heard someone say, "Once you try New Jersey wreck diving, you'll never want to dive in the Caribbean again." Well, I'm still not convinced, but I sure have been swayed.

It was a beautiful spring day as we left Belmar, NJ aboard the *Venture*, a 40 foot dive boat skippered by Paul Hepler. Paul, an ardent wreck aficionado, has led us to many exciting dive sites. Today would be no exception. Today we would journey 80 feet below the waves and visit the *Lana Carol*.

A 70 foot long trawler whose home port was Biloxi, Mississippi, the *Lana Carol* began her fatal voyage with a load of seashell stock acquired in North Carolina. On her trip northward, she encountered a battering northeaster off the New Jersey coast. Her downfall was supposedly a misplaced or missing hatch cover. It is through this opening that she began to take on water. The influx of seawater became more than her bilge pumps could handle so the decision was made to try for the nearest port. This was not to be. An urgent call was made for the Coast Guard. Rescue efforts were initiated and all hands were rescued.

The lone casualty was to be the *Lana Carol*. She slipped below the surface to find her final resting place seven miles east of Manasquan, NJ. Relatively intact, she has become a haven for cold water anemones, clams, mussels, lobsters and a myriad of fish and invertebrate life. Her outriggers loom above the deck with the eeriness of a moss covered Florida cypress tree in the early morning fog. The 30 foot visibility makes exploration of the wreck an adventure not to be forgotten. Nutrient rich waters sustain a cornucopia of marine invertebrate life. Multi-colored starfish forage across rolling meadows of mussels. Terraces of clams scale the vertical surfaces of the hull. Sea anemones wave their tentacles gracefully in the current. Their beauty is comparable with anemones anywhere in the world.

The cargo holds, which had previously transported many a fish to an unpleasant ending, now provide homes for ling, ocean pouts, crabs, lobster and numerous other members of the aquatic community. The captain and the crew have been replaced by the sea ravens and blackfish. Cold water soft corals have taken possession of the outriggers and masts. Mother Nature has taken every available space and provided housing for all of her children—certainly an awe in-



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Below: Blackfish, starfish and mussels.



spiring sight.

This artificial reef, compliments of the forces of nature and the misfortunes of man, provides a home for the New Jersey diver's favorite quarry, the lobster. On this particular day, the *Lana Carol* relinquished one of its older tenants, a ten pound lobster, truly a magnificent creature. Unfortunately, today its resourcefulness was no match for the agile, quick-handed diver.

As I cruised through the overgrown outriggers, I admired the beauty of the underwater life that had claimed this ship from the surface world and the manner in which the sea had taken an unsightly trawler and transformed it into a majestic underwater monument.

The sights and feelings which accompany a dive of this caliber can start the heart pounding and the adrenalin flowing in even the most ardent Caribbean diver. Sure, I'll still go back to the Caribbean, but I'll dive in New Jersey every chance I can get. 

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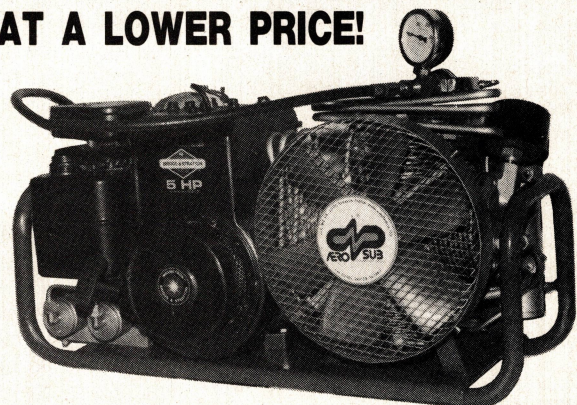
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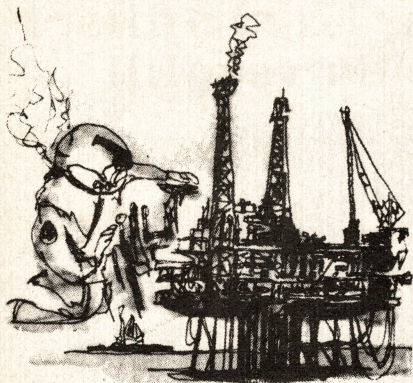
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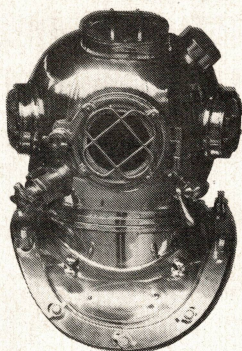
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BY DEREK K. GROUT

In retrospect, it was a little like looking for the proverbial needle in a haystack, except that I wasn't even sure where the haystack was.

"Good luck, Derek," my buddies, Gordon Kaylor and Richard Weiss, called from the dive boat. I squinted in the bright sunshine and then waved a gloved hand in acknowledgement, following it a moment later with the OK sign. Purging the air from my BC, I drifted slowly downward, alone in the silent darkness of Lake Champlain. The yellow tow line, attached to the home-made towboard which I held tightly in my left hand, was my only link to the surface.

It was an innocent enough beginning to the Labor Day weekend of 1977. No one in the group had any inkling of the adventure that would shortly unfold, making this one of my most memorable dives.

Still unaccustomed to the gloom, I raised my depth gauge to my face and, at a distance of nine inches, dimly made out the depth—70 feet. The needle crept slowly past 75 feet as I continued to stare at it, and I added a puff of air to my BC to stabilize the headlong descent.

Finally, from somewhere far above came the faint sound of a small outboard motor as Gordon and Richard started the engine of our 16 foot dive boat, the *Triton*. The tow line, my 300 foot umbilical cord to the world of light far above, quickly drew tight and I glided forward through the void.

I angled the board downward to continue my descent, frankly puzzled. No bottom had yet appeared and I wondered uneasily how much water still lay below me. According to the lake chart, the depth here should have been only about 60 feet, but I had already proved that the charts were wrong and getting more inaccurate by the minute.

A sudden cold shock—like entering a butcher's walk-in freezer—focused my mind once again on the dive as I passed through a second thermocline. By now my eyes had accustomed themselves to the green darkness and I caught a quick flash of mud bottom about three feet below me. I leveled the towboard to begin the underwater search and then decided it was time for another depth check. Raising my arm, I squinted at the dial as icy water flooded down the neck of my wetsuit. I made a mental note that I ought to buy a tighter wetsuit sometime very soon.

While I was preoccupied with the depth

gauge, the board came to an abrupt stop as I was pulled headfirst, at a leisurely pace, into a large piece of wood that had suddenly materialized out of the gloom in front of me. Slightly dazed, I released the towboard and then realized with a shock that the "piece of wood" was a wooden wall, actually the stern of a vessel whose vague outlines stretched away into the darkness as far as I could see.

The vessel rested upright on the bottom, perfectly preserved in the cold fresh water, and a line from the *Merchant of Venice* popped into my mind: "...a ship of rich lading, wrecked on the narrow seas...." In my excitement, I shouted into my regulator and a stream of bubbles headed noisily to the surface. It was the thrill of a lifetime and for a second I closed my eyes to imprint the scene on my brain, so that I could preserve the electric moment for the next 40 years.

A cloud of silt billowed up around me as I settled to the bottom. I knew that the wreck could only be the *Water Witch* and that, by an incredible stroke of luck, I had very possibly just set something of a record in finding a virgin shipwreck: ten minutes from the beginning of the underwater search and less than ten days since Gordon and I had stumbled across the name of the long-lost ship, and her approximate location, in an old archive.

I tied a marker to the wreck and briefly explored the stern section, gazing in silent wonder at the stark, simple beauty of her lines. A sturdy railing circled her afterdeck. A combination skylight/stairwell invited me to the after cabin, but I did not attempt to penetrate it on this first dive. There would be plenty of time, I felt, for that on later dives.

With regret, I cut short my exploration of the ship's stern and headed back to the surface. I had to share the news of the find with Gordon and Richard still circling slowly in the *Triton* over my air bubbles, wondering what could possibly have happened that would cause me to let go of the towboard after such a short time in the water.

To my chagrin, the marker I had attached to the rail was not long enough to reach the surface and I drifted away from the wreck in the moderate current. In spite of our efforts to relocate her, it was not until two frustrating years later that we again found the *Water Witch*, this time with the aid of a sidescan sonar owned by Jim Kennard of Fairport, New York.

Happily, when I returned to the wreck, it was obvious that she had not been found in the meantime.

The story of the *Water Witch* really begins early in 1832 when a new steam vessel slipped down the greased ways at Fort Cassin, Vermont and splashed into the cold, muddy waters of Lake Champlain at the mouth of Otter Creek. Christened the *Water Witch* by her owner and master, Captain Jahaziel Sherman, she was a small boat—as the lake steamers went—displacing only 107 tons. With a length of 90 feet and a beam of 17 feet, she drew eight feet of water.

Built at a cost of \$14,000, she was capable of reaching speeds of eight miles per hour. Her engines were relatively powerful at 40 hp and it was hardly surprising that she quickly found her niche in life as a general cargo carrier and tow vessel pulling timber rafts and barges between Ft. Cassin and Whitehall, N.Y. This latter port at the southern end of Lake Champlain was an important freight terminal, for it granted access to the Hudson River and the Erie Canal system. At the same time, in those halcyon days of steamboating before the railroads pushed through the Champlain frontier, Whitehall was the southern terminus of the steamboat route up the lake to St. John's, 150 miles to the north in Quebec.

Captain Sherman was a proud Yankee sailor and the new ship undoubtedly reflected the personality of her master-owner. He already had a long and distinguished career of sailing Lake Champlain behind him, including stints as master on the ill-fated steamboat *Phoenix* (SDM, August '81) and the steamer *Franklin*. However, after a disagreement with the directors of the Lake Champlain Transportation Company, Sherman decided to build his own vessel and go into business for himself. Somehow he managed to secure the necessary capital and late in 1831 he commissioned Samuel Wood to build the small vessel of black oak and seasoned pine.

It is obvious from our diving operations that this was no luxury vessel. The *Water Witch* had just two functions in life: To work hard and to make money for her owner. The ship was evidently poorly equipped for passengers, although local inhabitants were possibly glad enough to ride in her, for the fare would have been considerably less than that charged by the better class steamers. On the whole, though, the *Water Witch* was strictly a utility boat and during her short career carried few amenities for her crew or the occasional passenger.

In the archives of the Champlain Transportation Company, now housed in the library of the University of Vermont in Burlington, we have found a number of interesting documents relating to the *Water Witch*, shedding light on the operation of a commercial vessel in the colorful days of steamboating on the lake. Among

these documents, we have located the original fire insurance policy from 1834, issued by Aetna Insurance Company, and an agreement of November 21, 1833, under which Captain Sherman undertook with the CTC to confine his business to towing, leaving the passenger trade to the CTC.

From the archival record, it seems that Captain Sherman continued to operate the *Water Witch* privately until January 27, 1835, at which time the CTC purchased her for \$10,000—the contract is still in the archives—and kept her in the towing business. The purchase appears to have been a part of the CTC strategy to monopolize the steamboat business on Lake Champlain, for in the same year the aggressive company also bought out a number of other operators, including the Champlain Ferry Company and the St. Alban's Steamboat Company.

Sometime in 1836, the *Water Witch* was sold by the CTC to an unknown purchaser and it is at this point that the historical record becomes a little fuzzy. We have learned, however, that her engines were removed and sold, with the hapless vessel thus suffering the ultimate indignity of being converted to a two-masted cargo schooner.

This probably saved her for posterity, for, as a converted ship there can be little doubt that she handled poorly under sail and this would cost her dearly.

The end came quickly during a sudden November gale. Outbound from Port Henry with a cargo of local iron ore, the *Water Witch* encountered a sudden squall and foundered.

Seeing the wreck today, it requires no great leap of the imagination to picture her last tortured moments. Harassed by a giant sea, with waves crashing and breaking over her low freeboard, the holds quickly filled with water faster than the pumps could empty them. Then, suddenly, there was a shout of pure terror from the helmsman, struggling to maintain his position at the tiller and all hands turned to behold, through the needles of spray, a large wave bearing down on the *Water Witch*. The bow buried itself in the wave and the crew waited for it to break free, just as it had always done.

This time, though, it was not to be. The ship followed her bowsprit into the inky depths, evermore a prisoner of the lake. No longer would the *Water Witch*, as Cooper had described it, float "on its element like a seagull riding the billows."

As it happens, a good deal of inaccurate information has already found its way into print about the *Water Witch*. Walter Hill Crockett, for example, writes in his *History of Lake Champlain* that the *Water Witch* continued in service until the 1880s, but this is clearly not supported by the evidence we have gleaned to date from our diving activities.

Whatever the exact circumstances surrounding the loss of the *Water Witch*,

they are in stark contrast to the tranquillity of her final resting place, where no waves buffet her, no wharves crush her sides, no master crowds on sail to gain a bit more speed. Today the silence has been broken by five divers, the only ones so far to have seen her, and each one has been humbled by the majesty and the serenity of the wreck.

On our first group dive after relocating the wreck, it was immediately obvious that no other divers had visited her before. I was in awe, little realizing at the time I swam around the wreck that the *Water Witch* is very likely the oldest fully intact commercial vessel in the U.S.

Our initial objective was to see as much of the wreck as possible on the first dive and then compare impressions to determine a future plan of action based on our observations. Paired with Gordon, I swam to the bow to begin the dive.

Here the large portside anchor still lay hooked within its well, chained in place; the starboard anchor had fallen from its well, over the railing, and lay in the silt, as if to hold her firmly in place at the final anchorage. Before the two anchors extended a massive square bowsprit, stretching out over the muddy bottom like an accusing finger. A pair of deadeyes hung forlornly off the bowsprit at crazy angles.

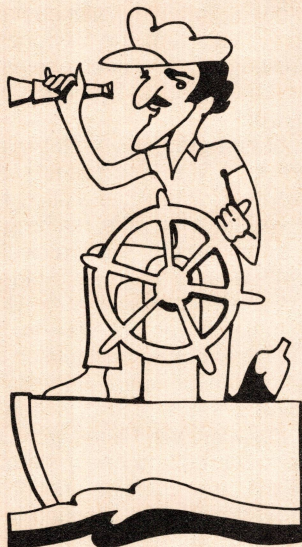
We paused at the remains of the foremast which had snapped about two feet above the deck; the splintered mast lay out over the starboard railing, its tip buried in the mud some 50 feet from the hull. There was not enough time to swim out to the end on this first exploratory dive but we later discovered that the wooden crosstree is still in place at the top of the mast. At the base, there is a ring of hand-carved wooden cleats.

Moving toward the stern, two open cargo hatches beckoned to us and we swam cautiously into one of the holds, careful not to disturb the accumulated silt. I shoved my hand into the mud and pulled free a heavy chunk of what turned out to be iron ore. Other large chunks of ore lay scattered on the deck, tossed there as the *Water Witch* took her final plunge. A device that seemed to be a primitive bilge pump poked out of the silt but we did not then examine it in detail.

There was no trace of the mainmast, other than a gaping hole in the deck just aft of the second cargo hatch. In later dives, however, we noted what appeared to be several sections of it lying alongside the wreck.

I took the reel of line that Gordon handed me and, after wrapping the free end around my wrist, returned the reel and gave him the OK sign. I crawled carefully down the short wooden staircase into what had once been the day cabin and played my light around in the blackness. It was a small cabin, half silted in, running the width of the ship and back about 12 feet. A number of wall panels had fallen from their nails and hung in the silt at cra-

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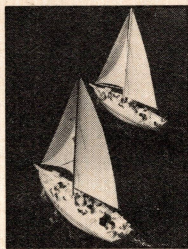
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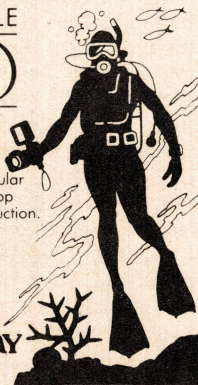
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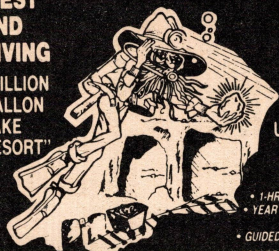
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WATER WITCH

zy angles. Surprisingly, this was the only sign on the whole vessel that time had taken its inexorable toll. Everywhere else, it appears that the crew is about to return to her at any minute.

To my dismay, some of the fallen wall panels still retained their original white painted trim, the only touch of color that I had seen on this otherwise uniformly brown wooden wreck. In a distant corner of the day cabin, a small school of bass stared dumbly back at the alien visitor. They were certainly not afraid and it occurred to me they had probably never seen a diver before.

In the shadows I noted what appeared to be a passageway leading to the after cabin, to what would certainly have been the captain's quarters, but it seemed to be partially blocked by the fallen wall panels. We would have to wait for another dive before it could be explored.

I turned slowly but in spite of my care the whole scene was abruptly blocked out by swirling silt. Regretfully, I returned to the deck, carefully following the line secured to my wrist. I nodded briefly to Gordon and we continued on. We had just enough time to inspect the strange tiller jutting out of the stern deck, which I had noted earlier on my discovery dive. Four small windows set in the stern caught Gordon's attention and he shone his light into the nearest one. Unfortunately, there was nothing to be seen, for fallen wall panels also blocked these windows in the captain's cabin. Our watches indicated it was time to leave. Reluctantly, Gordon jerked his thumb upward and I nodded. Thirty minutes may sound like a lot of time to a layman, but it was hardly enough time for us to form a coherent picture of the *Water Witch* and it would take several dives before all of the divers had seen the various features of the wreck. To be safe, Gordon and I used up the last few pounds of our air in a precautionary decompression stop at ten feet. There was little enough room for error in the cold water and we wanted to be on the safe side.

While hanging on the line, I caught Gordon's eyes, wide as saucers. He grinned and I knew at once he felt as I did. This lovely wreck would give us years of pleasurable diving.

Back on deck, the dive boat was a confused jumble of equipment and divers all talking at once and comparing notes. It was, as more than one diver remarked, the finest shipwreck we had ever seen. It's not a large vessel but it has character and history and, most importantly, it looks like a shipwreck should.

Since then, we have visited the *Water Witch* a number of times to explore her in detail and to photograph her. As yet, I believe that no other divers have found her but I have placed a small plastic plaque on the capstan to remind any future visitors of the uniqueness of this ship and its legacy. It reads simply: "This wreck, the *Water Witch*, 1832, found Sept. 3, 1977 by Derek Grout. Look, Enjoy."

The intact wreck, her timbers still strong and firm, is a mute testament to the skill and dedication of the shipwrights and artisans who fashioned her a century and a half ago. With only crude hand tools, they created what would one day become a time capsule, sealed at the moment of her unfortunate loss, and this is the real value of the *Water Witch*. The artifacts on board are not valuable in themselves, but in their context, for they are capable of telling us a great deal about daily life and work on an early lake boat. We know fairly well, from various sources the opulent life on some of the floating palaces that plied the lake. Charles Dickens, for example, was most impressed by his trip on the steamer *Burlington* in 1842 and later wrote about the vessel in his *American Notes*. Curiously, the captain of the *Burlington* was Richard Sherman, son of Jahaziel Sherman.

On the other hand, we know next to nothing about life on board a work boat. This, however, may change as a result of our work on the *Water Witch*.

There is no treasure on board, for those who sailed and worked the *Water Witch* led a frugal, difficult life by the standards of today. The vessel, however, was the home of a tight-knit, self-sufficient group of people and, as might be expected, it contains everything that they

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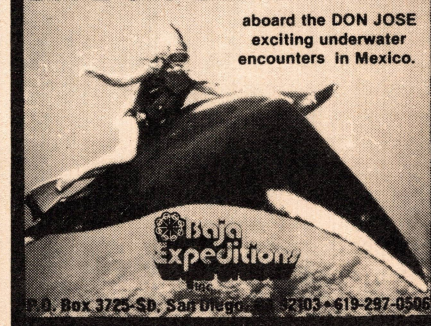
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WATER WITCH

had cause to use in the conduct of their daily lives. Of course, many of these objects would also have been found in the homes of ordinary people on land.

Diving the *Water Witch*, one gains a quick respect for the intrepid men who sailed her long ago. There is a terribly low freeboard and it is easy to visualize the large rollers on the Lake breaking over the deck as she struggled on her last trip. In a gale, merely steering her on a straight course with the crude tiller on the exposed afterdeck must have been a punishing ordeal.

Once, while exploring the cabin, I found myself wondering whether the old timers of Lake Champlain were correct. Local folklore has it that on certain autumn nights, when the northern lights flicker and dance wildly overhead and the freshening breeze blows down from Canada, you can still hear the cries of the sailors who have been lost on Lake Champlain. How many of them, I wondered, were from the *Water Witch*.

Jim Kennard's sidescan sonar surveys have turned up a number of other interesting details. Out in the mud on either side of the ship, places that a diver might not otherwise think to explore, are a number of sonar shadows that still have to be checked out. These may be large objects that broke loose from the ship as she took her final plunge. Also from the sonar, Jim noted an object about 30 feet behind the stern of the wreck and this turned out to be the remains of a small boat, the ship's dory, that was pulled down in the sinking. Here, then, was another clue that the ship sank quickly and for that reason I still ask myself if we will one day come across any of the crew's remains entombed in the wreck.

There is still much work that must be done with respect to the *Water Witch*. In the next diving season, we intend to conduct a number of feasibility studies to determine if she is sound enough to be raised and preserved one day, so that others besides a few privileged divers may see her and better understand their marine heritage. What happens after that will, of course, be the subject of lengthy negotiations with the various levels of government involved. It will also, I am sure, involve raising a great deal of money if anything of substance is to be done.

I hope, too, that we will one day learn the fate of the crew and unravel more of the mystery still surrounding the ship. At the same time, I would like to think that we can never learn the full story of the *Water Witch*, for she is a real lady of the lake and, like most ladies, never reveals all her secrets. Indeed, as Cooper wrote of his fictional vessel, "Ah! she is a bewitching creature."

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